COURSE STRUCTURE

MBA I SEMESTER

S. No	Course Code	Course Title	Hours per week			Total contact hours	Credits
			Lecture	Tutorial	Practical		
1	18MB1T01	Management Process & Organizational Behavior	4	1	--	5	4
2	18MB1T02	Managerial Economics	4	1	--	5	4
3	18MB1T03	Financial Accounting & Analysis	4	1	--	5	4
4	18MB1T04	Business Communication & Soft Skills	4	1	--	5	4
5	18MB1T05	Quantitative Techniques For Business Decisions	4	1	--	5	4
6	18MB1T06	Business Environment & Policy	4	1	--	5	4
7	18MB1L07	Information Technology Lab	--	--	3	3	2
Total						**33**	**26**

MBA II SEMESTER

S. No	Course Code	Course Title	Hours per week			Total contact hours	Credits
			Lecture	Tutorial	Practical		
1	18MB2T01	Financial Management Theory and Practice	4	1	--	5	4
2	18MB2T02	Human Resource Management	4	1	--	5	4
3	18MB2T03	Marketing Management	4	1	--	5	4
4	18MB2T04	Production and Operations Management	4	1	--	5	4
5	18MB2T05	Research Methodology for Managers	4	1	--	5	4
6	18MB2T06	Business Ethics & Corporate Governance	4	1	--	5	4
7	18MB2T07	Tourism & Hospitality Management	4	1	--	5	4
Total						**35**	**28**

MBA III SEMESTER

S. No	Course Code	Course Title	Hours per week			Total contact hours	Credits
			Lecture	Tutorial	Practical		
1	18MB3T01	Strategic Management	4	1	--	5	3
2	18MB3L02	Data Science using R	0	0	6	3	3
3	18MB3T03	Operations Research	4	1	--	5	3
4		Elective -1 Paper 1	4	1	--	5	3
5		Elective -1 Paper 2	4	1	--	5	3
6		Elective -2 Paper 1	4	1	--	5	3
7		Elective -2 Paper 2	4	1	--	5	3
Total						**33**	**21**

MBA IV SEMESTER

S. No	Course Code	Course Title	Hours per week			Total contact hours	Credits
			Lecture	Tutorial	Practical		
1	18MB4T01	Logistics and Supply Chain Management	4	1	--	5	3
2	18MB4T02	Legal Aspects of Business	4	1	--	5	3
3	18MB4T03	Entrepreneurship & Project Management	4	1	--	5	3
4		Elective -1 Paper 3	4	1	--	5	3
5		Elective -1 Paper 4	4	1	--	5	3
6		Elective -2 Paper 3	4	1	--	5	3
7		Elective -2 Paper 4	4	1	--	5	3
8	18MB4P19	Project	--	--	--	--	6
Total						**35**	**27**

Electives: The student ought to choose any **TWO** specializations from the following areas and also from each specialization any **TWO** courses have to be chosen at the beginning of III semester.

MBA II YEAR III Semester Specialization Subjects

Finance

18MB3T04	-	Financial Markets and Services
18MB3T05	-	Security Analysis & Portfolio Management
18MB3T06	-	Banking & Insurance Management

Marketing

18MB3T07	-	Consumer Behavior & Analysis
18MB3T08	-	Digital & Social Media Marketing
18MB3T09	-	Promotion & Distribution Management

Human Resource Management

18MB3T10	-	Performance Management
18MB3T11	-	Welfare Management
18MB3T12	-	Compensation Management

Business Analytics

18MB3L13	-	Data Visualization for Managers
18MB3L14	-	Business Forecasting
18MB3L15	-	Management Information System

Entrepreneurship

18MB3T16	-	Micro Small Medium Enterprise Management
18MB3T17	-	Venture Capital & Private Equity
18MB3T18	-	Entrepreneurship & Innovation Management

MBA II YEAR IV Semester Specialization Subjects

Finance

18MB4T04	-	Risk Management & Derivatives
18MB4T05	-	Tax Management
18MB4T06	-	Strategic Financial Management

Marketing

18MB4T07	-	International Marketing Management
18MB4T08	-	Customer Relations & Services Marketing
18MB4T09	-	Retail Management

Human Resource Management

18MB4T10	-	Leadership Management & Team Dynamics
18MB4T11	-	Change Management
18MB4T12	-	Training & Development

Business Analytics

18MB4L13	-	Database Management System
18MB4L14	-	Marketing Analytics
18MB4L15	-	Data warehousing and Data mining

Entrepreneurship

18MB4T16	-	Corporate Entrepreneurship
18MB4T17	-	Startup & New Venture Management
18MB4T18	-	Social Enterprise Management

I SEMESTER

MBA I SEMESTER

L	T	P	C
4	1	0	4

18MB1T01: MANAGEMENT PROCESS AND ORGANISATIONAL BEHAVIOUR

Course Outcome – The students will be enlightened with all the basic concepts and theories in organisation perspective and making them industry ready.

Course Content

Unit – I Nature of Management -Importance of Management, Evolution of Management Thought, Principles of Management, Management Process/Functions, and a System View.Social Responsibilities of Business - Manager and Environment Levels in Management - Managerial Skills.

Unit—II Planning - Steps in Planning Process - Scope and Limitations - Short Range and Long Range Planning - Flexibility in Planning ¬Characteristics of a sound Plan - Management by Objectives (MBO) - Policies and Strategies - Scope and Formulation - Decision Making - Techniques and Processes - Management of Innovation - Entrepreneurial Management - Benchmarking

Unit-III Organising - Organisation Structure and Design - Authority and Responsibility Relationships - Delegation of Authority and Decentralisation - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organisational design - Mechanistic vs Adoptive Structures - Formal and Informal Organisation.

Unit – IV Perception and Learning - Personality and Individual Differences - Motivation and Job Performance - Values, Attitudes and Beliefs - Stress Management - Communication Types-Process - Barriers - Making Communication Effective.

Unit – V Group Dynamics - Leadership - Styles - Approaches - Power and Politics - Organisational Structure - Organisational Climate and Culture - Organisational Change and Development, Comparative Management Styles and approaches - Japanese Management Practices Organisational Creativity and Innovation - Best Management Practices across the world - Select cases of Domestic & International Corporations - Management of Diversity.

Text Book -

1. Drucker, Peter, F., 1981. Management: Tasks, Responsibilities and Practices, Allied Publishers, New

Delhi.

2. Hodgets, Richard M., 1986, Management Theory: process and Practice, Academic Press, London.

References:

1. Stoner, James. A.F. and Freeman.E.R., 1989. Management, Prentice Hall of India, New Delhi.

2. Katz R.L., 1974. Skills of an Effective Administrator, Harvard Business Review, 52(5) 90- 102.

3. Newman, William Hsummer, Charles E. and Warren, E, 1974. The Process of Management: Concepts, Behaviour and Practice, Prentice Hall of India; New Delhi.

4. Alvin Toffler, 1970. Further Shore, Random House, New York

MBA I SEMESTER

L	T	P	C
4	1	0	4

18MB1T02 MANAGERIAL ECONOMICS

Course Outcome –The students are imbibed with basic and intermediate economic concepts and make them to be best at economic and business analysis

Course Content

UNIT –I Introduction to Managerial Economics: Definition, Nature and Scope, Relationship with other areas in Economics, The role of managerial economist. Concept of opportunity cost, Incremental concept, Discounting Principle.

UNIT –II Demand Analysis: Elasticity of demand, types and significance of Elasticity of Demand - Measurement of price Elasticity of Demand – Need for Demand forecasting, forecasting techniques, law of Supply, Elasticity of Supply.

UNIT –III Supply and Production Analysis: Production function, Marginal Rate of Technical Substitution, Production functions with one/two variables, Cobb-Douglas Production Function, Returns to Scale and Laws of returns.

UNIT –IV Cost theory and estimation: Cost concepts, determinants of cost, cost – output relationship in the short run and long run —cost curves– Average total cost curve – Cost - Volume – Profit analysis - Pricing methods in practice – Managerial Theories of a firm – Marris& Williams Models.

UNIT-V Market Structure and Pricing practices: Features and Types of different Markets – Price- Output determination in Perfect competition, Monopoly, Monopolistic competition and Oligopoly both in the long run and short run - Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books -

1. Paul, Koushil: "**Managerial Economics**", Cengage Learning, New Delhi,

2. Siddiqui S A,Siddiqui A S: "**Managerial Economics**", and Financial Analysis", New Age International Publishers, New Delhi, 2008.
3. VanitaAgarwal: "**Managerial Economics**", Pearson, New Delhi, 2013.

References

4. Dominick Salvatore: "**Managerial Economics**", Oxford University Press, New Delhi,2010.

5. D.L. Ahuja: "**Managerial Economics**", S. Chand & Company ltd,New Delhi-55.

6. O'Sullivan, Sheffrin, Perez "Micro Economics: Principles, Applications and Tools", Pearson Education.

7. Mithani D M: ''**Managerial Economics**", Himalaya Publishing House, Mumbai, 2008.
8. Atmanand: "**Managerial Economics**", Excel Publications. New Delhi, 2012.

9. Varshney, R.L and Maheswari, K L: ''**Managerial Economics**", Sultan Chand and Sons, New Delhi, 2002.
10. NarayananNadarE, Vijayan S: ''**Managerial Economics**", PHI Private Limited, New Delhi,2009.

L	T	P	C
4	1	0	4

MBA I SEMESTER

18MB1T03: FINANCIAL ACCOUNTING & ANALYSIS

Course Outcomes – The students will be prepared with appropriate subject in Finance and Accounts domain, making them masters and give their best at problem solving skills.

Course Content

UNIT-I Accounting Process: Meaning of Accountancy, book-keeping and Accounting, Definition of accounting, Accounting Cycle. Classification of accounts, Branches of accounting, accounting equation – objectives, Scope and nature of accounting. Users of accounting information. Introduction to GAAP, Accounting Concepts and conventions and their implications on the data generation. Books of original entry, ledger- Preparation of Trial balance.

UNIT-II Understanding Terminal accounts: Preparation and Presentation of income statement - Balance Sheet with Adjustments - Accounting standards - Preparation and Presentation of Company Final Accounts – Limitations of Financial Statements. Human resource accounting concept and importance.

UNIT-III Valuation of Fixed Assets: Meaning, definition of asset. Classification of Assets Concept of depreciation; Causes of depreciation; Depreciation, depletion, amortization, and dilapidation; Depreciation Accounting; Methods of recording depreciation; Methods for providing depreciation; Depreciation of different assets.

UNIT-IV Financial Analysis: The scope and purpose of financial analysis - financial statement analysis - Ratio analysis – liquidity, activity, structural, coverage and profitability ratios - Funds flow analysis - concepts of funds; ascertaining funds from operations ; Sources of funds - Uses of funds - Preparation and analysis of funds flow statement and cash flow statement.

UNIT-V A) Understanding Cost Concepts: Introduction, Meaning of Cost, Objective of Costing, Classification of Cost, and - Elements of cost - Financial accounting Vs Management Accounting Vs Cost Accounting - Basic Cost concepts

B) Marginal Costing and Applications: - CVP analysis and decision making - Break Even analysis-Key factor distribution & analysis - Optimization of Product mix - Make or Buy decisions - Capacity utilization - Plant shutdown or continue decision CVP under conditions of uncertainty - sensitivity analysis.

Text Books -

• Ashish K .Bhattacharya "Financial Accounting & Analysis" PHI, 2012.

•M.N.Arora: Cost & Management Accounting, HPH, 2011.

References

• V.Rajasekharam "Financial Accounting & Analysis" Pearson Education, New Delhi, 2012

• Ranjan Kumar Bal: "Financial Accounting & Analysis", S.Chand, New Delhi, .2012

• Dr.P.Vijay Kumar: "Accounting For Managers" HPH-2014.

• K.K.Verma "Financial Accounting & Analysis" PHI, 2012.

MBA I SEMESTER

L	T	P	C
4	1	0	4

18MB1T04: BUSINESS COMMUNICATION AND SOFT SKILLS

Course Outcomes – The students are groomed with a channel of business communication skills and are best at bringing out productive work from within their colleague and associates.

Course Content -

Unit – I Role of Communication in Business – Objective of Communication – The Process of Human Communication – Media of Communication, Written Communication – Oral Communication – Visual Communication, Audio Visual Communication – Silence - Developing Listening Skills – Improving Non–verbal Communication kills – Understanding Cultural Effects of Communication.

Unit – II Managing Organization Communication - formal and Informal Communication- Intra and Personal Communication – Models for Inter Personal Communication – Exchange Theory, Johari Window and Transactional Analysis.

Unit-III Managing Motivation to Influence Interpersonal Communication – Inter-Personal Perception – Role of Emotion in Inter Personal Communication- Communication Styles – Barriers of Communication – Gateways to Effective Interpersonal Communication.

Unit-IV: Business Writing Skills – Significance of Business Correspondence, Essentials of Effective Business Correspondence, Business Letter and Forms - Academic Report Writing Difference between Academic and Business Reports Proposal Writing and Process Description, Oral Presentations – Meetings, Telephone Communication – Use of Technology in Business Communication, E-mail Messages.

Unit-V: Report Writing – Meaning and Significance; Structure of Reports; Negative, Persuasive and Special Reporting; Informal Report – Proposals; Formal Reports; Organization of Press Report - • Technical Proposals • Writing Proposals • Supplementary Parts / Appended Parts • Citing sources

(Case Study is compulsory in all Units)

Text Books -

1. K Bhardwaj, Professional Communication, IK Int Pub House, New Delhi
2. Krizan, Merrier, Logan and Williams, Effective Business Communications, Cengage, New Delhi
3. HC Gupta, SG Telang, Business Communication, Wisdom, Delhi

Reference Books:

4. Penrose, Business Communication for Managers, Cengage, New Delhi
5. McGrath, Basic Managerial Skills for All 5th ed., Prentice Hall of India.
6. UrmilaRai& S.M. Rai, Business Communication, Himalya Publishers,
7. Meenalshi Raman—Business Communication Oxford University Press.
8. Lesikar I Flatley, Basic Business Communication, Tata McGraw Hill.

MBA I SEMESTER

L	T	P	C
4	1	0	4

18MB1T05: QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS

Course Outcomes – The students are trained at critical thinking, business analysis and out of box problem solving skills with proper domain knowledge

Course Content

Unit-I Introduction to Statistics-Overview, origin and development and Managerial Applications of statistics and the branches of the study, statistics& computers, Diagrammatic and graphical representation of data, classification and tabulation of data. One dimensional, two dimensional, imitations of statistics.

Unit-II Measures of central Tendency- Mean, Median, Mode, Geometric Mean and Harmonic Mean, Dispersion-Range Quartile deviation, Mean Deviation, Standard deviation and co-efficient of variation Skewness: Karle Pearson co-efficient of skewness, Bow leys co-efficient of skewnessKelley's co-efficient ofskewness.Theory and problems.

Unit-III Concept of Probability- Probability Rules – Joint and Marginal Probability, Simple problems on Addition Law of probability Multiplication Law of probability– Baye's-Theorem-Probability Distributions- Binomial, Poisson, Normal.

Unit-IV Correlation Analysis-Scatter diagram, Positive and Negative correlation, limits for coefficient of Correlation, Karl Pearson's coefficient of correlation, Spearman's Rank correlation, concept of Multipleand partial Correlation.Regression Analysis-Concept, least square fit of a linear regression, two lines of regression, Properties ofregression coefficients.

Unit-V Time Series Analysis-Components, Models of Time Series–Additive, Multiplicative and Mixed models; Trend analysis-Free hand curve, Semi averages, moving averages, Least Square methods, measurement of seasonal variations- simple averages method, ratio to moving average, link relatives method and Index numbers – introduction Characteristics and uses of index numbers

,types of index numbers , un weighted price indexes weighted price indexes, Tests of adequacy and consumer priceindexes, wholesale price index numbers, limitations of index numbers.

Text Books -

1. Levin R.I., Rubin S. David, “Statistics for Management”, 2015, 7th Ed. Pearson.

2. Gupta S.C, “Fundamentals of Statistics”, 2015, 6th Ed. HPH.,

References

3. Levine , Stephan , krehbiel , Berenson -Statistics for Managers using Microsoft Excel,PHI .

4. J. K Sharma, “Business Statistics”, 2015, 2nd Ed. Pearson.

	L	T	P	C
MBA I SEMESTER	**4**	**1**	**0**	**4**

18MB1T06: BUSINESS ENVIRONMENT & POLICIES

Course Outcomes – The students are dumped with domain knowledge, economic environment understanding and Global exposure & Legal framework

Course Content

Unit –I The concept of Business Environment: Internal, External, Micro, Macro and Global Environment as a tool of Managerial Practices, Business Environment in India - Social, Political, Demographic and Technological, Interaction Matrix of Different Environmental Factors, Indian economics: Issues and Challenges, Economic Systems, Balance of Payments.

Unit –II Circular Flow of Money in a Multi-sector Economy: Concepts and Measurement of National Income, Business Cycles: Phases, Privatization and Disinvestment - Concept of Inflation, Deflation, Stagflation etc. and Unemployment.

Unit –III Income Generation Theories: Consumption, Saving and Investment, Autonomous vs. Induced Investment and Multiplier, Pump Priming.

Unit –IV Indian Economic Policies: Industrial Policy, Monetary Policy & Fiscal Policy in an open Economy, Consumer Protection Policy, IPR, Taxation Policy-GST, RTI, FERA & FEMA, IT Act,

International business environment: Nature- significance-Challenges and mechanisms, EXIM Policy

WTO: Agreements in the Uruguay round, TRIPS, TRIMS and GATS, Disputes settlement Mechanism, Dumping and antidumping.

Unit-V Legal Frame: Competition Act, Bankruptcy code, NITI AYOG, SICA 1985 - Industrial Sickness in India, BIFR 1995, Environmental Laws - Central Banking System, Financial Markets, FDI and FII Policy.

Text Books

1. Mishra, S. K. and Puri, V. K. - Economic Environment and Business, Himalaya Publishing House, New Delhi, fifth and Revised Edition, 2009.

2. Sapiro, E. - Macro Economic Analysis, Galgotia Publishing House, New Delhi, Fifth Edition.

Reference Books

1. Cherunillam, F. - Business Environment, Himalaya Publishing House, New Delhi

2. Dhingra, I. C. - The Indian Economy; Environment and Policy, Sultan Chand Publishers, New Delhi.

3. Dornbusch, R., Fischer, F. and Startz, R. - Macroeconomics, McGraw-Hill

4. Gupta, R.D. and Rana, A.S. - Keynes Post-Keynesian Economics, Kalyani Publisher, New Delhi. (Latest Edition)

5. Goyal, A. and Goyal, M. - Business Environment, VK India Publications, New Delhi.

6. Ghosh, B. - Economic Environment of Business, Vikash Publishing House, Delhi

7. Mishra, S. K. and Puri, V. K. - Indian Economy, Himalaya Publishing House, New Delhi

8. Saleem, S. - Business Environment, Pearson Education, Delhi, fourth Edition, Reprint, 2009.

L	T	P	C
0	0	3	2

MBA I SEMESTER

18MB1L07 INFORMATION TECHNOLOGY LAB

Course Outcome – A student will be equipped with ample knowledge and best usage of technical tools to be innovative and a proper Manager.

Course Contents

Unit – IMS Word: Word basics, formatting text and documents, tables, pictures, mail merging, SQL, short cut keys and its significance in present business environment.

Unit – II MS-EXCELL: Creating, editing and printing of worksheets. Data entry, formatting cells and cell referencing. Creating and using formulas and functions use of copy, move and paste optionshort cut keys, Decision making using advanced MS-EXCELL.

Unit- IIIMS-ACCESS & Power point: Filling a series, sorting data, querying of data. Charts, flow diagrams TQM methodologies,short cut keys. Preparation and presentation of slides for various business proposals and meetings.

Unit- IVFinancial modelling:like present value of cash flows, valuations, financial ratio analysis, forecasting, trend analysis of data, random input generations.

Unit – V Statistics for management - correlation and regression analysis data presentation techniques. Spread sheet showing the monthly payments with changing interest rate over a period of loan. (Using excel).

Preparation and presentations of mini projects assigned for course work of first semester.

References:

1. Shelly, Cashman: “Microsoft copies 2007”, Cengage Learning, New Delhi. 2012

II SEMESTER

MBA II SEMESTER

L	T	P	C
4	1	0	4

18MB2T01 FINANCIAL MANAGEMENT THEORY & PRACTICE

Course Outcomes – The students will be prepared with appropriate knowledge in Finance domain, making them masters & give their best at critical thinking & problem solving skills.

Course Content

UNIT –I Financial Management: Concept - Nature and Scope - Evolution of financial Management -Goals and objectives of financial Management - Firm's mission and objectives - Profit maximization Vs. Wealth maximizationVsValue Maximization - Major decisions of financial manager.

UNIT-II Sources of Finance: Introduction to Sources of finance- Long Term, Short term – Financial Instruments- Equity Shares, Preference Shares, Debentures, Bonds its features, characteristics and Accounting procedure for Issue of shares and Debentures(Simple problems).

UNIT-III Financing Decision: Concept of Capital Structure, Capital Structure Decisions and Theories of Capital Structure – EBIT –EPS analysis. Concept of leverage and types of leverage. Cost of Capital: Weighted Average Cost of Capital.

UNIT –IV Investment Decision: Concept of Time Value of money – Techniques of Time Value of Money– Nature and Significance of Investment Decision – Estimation of Cash flows – Capital Budgeting Process – Techniques of Investment Appraisal – Payback period, Accounting Rate of Return, Time Value of Money – DCF Techniques- Net Present Value, Profitability Index and Internal Rate of Return.

UNIT-V Liquidity &Dividend Decision: Meaning - Classification and Significance of Working Capital –Components of Working Capital – Factors determining the Working Capital – Estimating Working Capital requirement– Budget, Budgeting – types of budgets and preparation of budgets. Dividend Meaning and Significance – Major forms of dividends — Determinants of Dividend.

Text books -

1. I.M. Pandey: "**Financial Management",**Vikas Publishers, New Delhi, 2013.
2. Sudarshan Reddy: Financial Management, HPH, New Delhi.

References

1. P.Vijaya Kumar, M.Madana Mohan, G. SyamalaRao:"**Financial Management",** Himalaya Publishing House, New Delhi,2013.
2. Rajiv Srivastava, Anil Misra: "**Financial Management**", Oxford University Press, New Delhi,2012.Delhi,2012.
3. Prasanna Chandra: "**Financial Management Theory and Practice**", Tata McGrawHill 2011.

MBA II SEMESTER

L	T	P	C
4	1	0	4

18MB2T02 HUMAN RESOURCE MANAGEMENT

Course Outcome –The students will be best endowed with leadership & team work and shall be toned professionals with ethics and social responsibility.

Course Content

UNIT –IHRM: Definition and Functions and Significance –Scope and evolution of HRM- Principles - HR policies–Functions of HR Manager-Role and position of HR department – Human Resource Management in Changing Environment-emerging trends in HRM.

UNIT –IIFUNCTIONAL HRM: HR Planning -Recruitment and Selection- Tests and Interview Techniques - Training and Development- Techniques – Training evaluation - retention - Job Analysis – job description and specifications -HRD concepts.

UNIT –IIIPERFORMANCE APPRAISASL: Meaning and Importance - Traditional and Modern methods – Latesttrends in performance appraisal - Career Development and Counseling- Compensation, Concepts and Principles- Influencing Factors- Current Trends in Compensation - CollectiveBargaining–disputes resolution mechanisms-Grievances

UNIT –IVWAGE AND SALARY ADMINISTRATION: Wage and Salary- Wage Structure- Wage and Salary Policies- LegalFrame Work- Determinants of Payment of Wages- Wage Differentials - Job design and Evaluation-Methods - Concept of Industrial Relations-Trade Unions - Employee Participation Scheme

UNIT-VWELFARE MEASURES: Welfare management: Nature and concepts – statutory and non-statutory welfare measures –Role of Welfare officer- incentive mechanisms- Safety at work – nature and importance – work hazards – safety mechanisms - Managing work place stress - HRIS-HR Accounting-HR Audit.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books -

1. K Aswathappa: "***Human Resource and Personnel Management***", Tata McGraw Hill, New Delhi, 2013

2. N.SambasivaRao and Dr. Nirmal Kumar: "**Human Resource Management andIndustrial Relations**", Himalaya Publishing House, Mumbai

References

3. Mathis, Jackson,Tripathy:"***Human Resource Management:Asouth-Asin Perspective***", Cengage Learning, New Delhi, 2013
4. SubbaRao P: "***Personnel and Human Resource Management-Text and Cases***", Himalaya Publications, Mumbai, 2013.
5. MadhurimaLall, SakinaQasimZasidi: "**Human Resource Management**", Excel Books, New Delhi, 2010

MBA II SEMESTER

L	T	P	C
4	1	0	4

18MB2T03 MARKETING MANAGEMENT

Course Outcomes –The students are provided with basic domain knowledge and acts as a stepping stone for further proceedings and better helps in understanding business environment and global exposure in Marketing perspective.

Course Content -

UNIT –I Introduction to Marketing: Concept of Market, Marketing and Marketing Mix - Product and Production Concept - Sales and Marketing Concept - Societal Marketing Concept - Indian Marketing Environment.

UNIT –II Market Segmentation, Targeting& Positioning: Identification of Market Segments - Consumer andInstitutional/corporate Clientele - Segmenting Consumer Markets - Segmentation Basis – Evaluation and Selection of Target Markets – Positioning for competitive advantage.

UNIT –III Pricing Strategy: Objectives of Pricing - Methods of Pricing - Selecting the Final price -Adopting price - Initiating the price cuts - Imitating price increases - Responding to Competitor's price changes.

UNIT –IV Marketing Communication: Communication Process – Communication Mix - ManagingAdvertising Sales Promotion - Public relations and Direct Marketing - Sales force - Objectives of Sales force - Structure and Size - Sales force Compensation - Green marketing; Cyber marketing; Relationship marketing and other developments of marketing.

UNIT –V Marketing Research: Meaning and scope of marketing research; Marketing research process. Marketing Organisation and Control: Organising and controlling marketing operations, Social, ethical and legal aspects of marketing; Marketing of services; International marketing;

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books -

1. Lamb, Hair, Sharma: "**MKTG**" Cengage Learning , New Delhi, 2013

2. Phillip Kotler: "**Marketing Management** ", Pearson Publishers, New Delhi, 2013.

References

3. RajanSexena: "**Marketing Management**", Tata McGraw Hill, New Delhi, 2012.
4. R.Srinivasan: "**Case Studies in Marketing**", PHI Learning, New Delhi, 2012
5. Tapan K Pand: "**Marketing Management**", Excel Books, New Delhi, 2012
6. Paul Baines, Chris Fill, Kelly Page Adapted by Sinha K: "**Marketing**", Oxford University Press, Chenni, 2013.

MBA II SEMESTER

L	T	P	C
4	1	0	4

18MB2T04 PRODUCTION & OPERATIONS MANAGEMENT

Course Outcomes - **The students are trained at critical thinking, business analysis and innovative problem solving skills with adequate domain knowledge**

Course Content

UNIT –IIntroduction: Overview & Definition of Production and Operations Management-. Understanding similarities and difference among products, goods and services. Nature andScope of Production and Operations Management- Historical Evolution, Operations management strategy framework –Role & responsibilities of the production manager - Types of Manufacturing Processes.

UNIT –IIProduction Planning and Control: Stages in PPC – Gantt – PPC in Mass, Batch, and Job OrderManufacturing- Aggregate planning and Master Scheduling, MRP-I, MRP-II, CRP. Maintenance management & Industrial Safety - ERP, lean system, Constrain management (TOC). . Inventory Control, Costs & Types of Inventory. – ABC, VED and FSN analyses. Value Analysis and value Engineering

UNIT –IIISystem Design: Product strategy and integrated product development. Plant Location & Layout Planning- Factors influencing location - types of layouts. Capacity Planning – Optimal Production Strategies: Scheduling and Sequencing of Operations. Computer integrated manufacturing, DSS for operational management. Work Design: Method Study and Work Measurement - Work Sampling.

UNIT –IVManaging of Work Environment: – Automation --Technology Management - WasteManagement. Quality Assurance and Quality Circles – Statistical Quality Control –Control Charts for Variables- Average, Range and Control charts for Attributes. Purchase functions and Procedure - Inventory control – Types of Inventory– Safety stock – Inventory Control Systems – JIT, VMI.

UNIT –VProduct Quality Improvement: Basic concepts of quality, dimensions of quality, Juran's quality trilogy,Deming's 14 principles, Quality improvement and cost reduction, ISO 9000-2000 clauses & coverage. Six Sigma, Productivity –factors affecting productivity, improvements in productivity - new product development and design - stages & techniques

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books -

1. PannerSelvem: "**Production and Operation Management**", Prentice Hall of India, NewDelhi, 2012.
2. K.Aswathappa, K. Shridhara: "**Production & Operation Management**", Himalaya Publishing House, New Delhi, 2012

References

3. Ajay K Garg: "**Production and Operation Management**", TMH, New Delhi,2012
4. Deepak Kumar Battacharya: "**Production & Operation Management**", University Press, New Delhi, 2012
5. AlanMuhlemann, JohnOakland,jastiKatyayani: "**Production and OperationManagement**", Pearson, New Delhi,2013

MBA II SEMESTER

L	T	P	C
4	1	0	4

18MB2T05 RESEARCH METHODOLOGY FOR MANAGERS

Course Outcomes –The students are trained at critical thinking, business analysis and best equipped with research oriented problem solving skills

Course Contents

Unit- I Introduction to Research*:* Meaning of research; Types of research; the process of research; Research applications in social and business sciences; Features of a Good research study.

Unit-II Research Problem and Formulation of Research Hypotheses*:* Defining the Research problem; Management Decision Problem vs. Management Research Problem; Problem identification process; Components of the research problem; Formulating the research hypothesis- Types of Research hypothesis; Writing a research proposal- Contents of a research proposal and types of research proposals.

Unit –III Research Design*:* Meaning of Research Designs; Nature and Classification of Research Designs; Exploratory Research Designs: Secondary Resource analysis, Case study Method, Expert opinion survey, Focus group discussions; Descriptive Research Designs: Cross-sectional studies and Longitudinal studies; Experimental Designs, Errors affecting Research Design - Structure of the research report- Preliminary section, Main report, Interpretations of Results and Suggested Recommendations; Report writing: Formulation rules for writing the report: Guidelines for presenting tabular data, Guidelines for visual Representations.

Unit –IV Data and Sampling*:* Classification of Data; Uses, Advantages, Disadvantages, Types and sources; Primary Data Collection: Observation method, Focus Group Discussion, Personal Interview method.**Attitude Measurement and Scaling***:* Types of Measurement Scales; Attitude; Classification of Scales: Single item vs Multiple Item scale, Comparative vs Non-Comparative scales, Measurement Error, Criteria for Good Measurement. **Questionnaire Design***:* Questionnaire method; Types of Questionnaires; Process of Questionnaire Designing; Advantages and Disadvantages of Questionnaire Method**. Sampling***:* Sampling concepts- Sample vs Census, Sampling vs Non Sampling

error; Sampling Design- Probability and Non Probability Sampling design; Determination of Sample size- Sample size for estimating population mean, Determination of sample size for estimating the population proportion.

Unit-V Testing of Hypotheses*:* Concepts in Testing of Hypothesis – Steps in testing of hypothesis, Test Statistic for testing hypothesis about population mean; Tests concerning Means- the case of single population; Tests for Difference between two population means; Tests concerning population proportion- the case of single population; Tests for difference between two population proportions.- **Chi-square Analysis***:* Chi square test for the Goodness of Fit; Chi square test for the independence of variables; Chi square test for the equality of more than two population proportions.- **Analysis of Variance:** Completely randomized design in a one-way ANOVA; Randomized block design in two way ANOVA.

Text Books

1. C.R.Kotari-"Research Methodology for Business"-Excel Publishing House.
2. Cooper R.Donald and Schindler S. Pamela: "***Business Research Methods***", 9/e, Tata MCGraw Hill, New Delhi.

Reference books

1. John W. Creswell Research design- Qualitative ,Quantitative and mixed methods approaches 4th edition

MBA II SEMESTER

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18MB2T06 BUSINESS ETHICS & CORPORATE GOVERNANCE

Course Outcomes –The students shall be cultivated with ethics and social responsibility which in turn shall be the for the betterment of country and also for the overall development of the organization they are joining.

Course Content

Unit-I: **Understanding Corporate Governance**: Corporate governance – an overview, History of corporate governance- Concepts of Corporate Governance: Theory& practices of corporate governance, corporate governance mechanism and overview – land marks in emergence of corporate governance.

Unit-II: **Stakeholders**: Rights and privileges; problems and protection, Corporate Governance and Other stakeholders- Board of Directors: A Powerful Instrument in Governance; Role and responsibilities of auditors.

Unit-III: **Codes of corporate governance**: Development of codes and guidelines and summary of codes of best conduct, Banks and corporate governance; Ganguly committee's Recommendation.

Unit-IV: **Business Ethics and Corporate Governance**: Corporate Social Responsibility: Justification, Scope and Indian Corporations-Environmental Concerns and Corporations: Indian Environmental Policy, The Role Of Media in Ensuring Corporate Governance; Ethics in Advertising.

Unit- V: **Acts & Policies**: Monopoly, Competition and Corporate Governance; MRTP Act and Competition Act, The Role of Public Policies in Governing Business, SEBI, The Role of Government in Developing and Transition Economics- Corporate Governance in Developing and Transition economies, Corporate Governance: Indian scenario, The Corporation in a Global Society.

Text Books -

1.Corporate governance: Principles, policies and Practices, Fernando, A.C., Pearson.
2. Business ethics: Concepts & cases, velasquez, Manuel G.,Pearson.

3. Corporate governance: Principles, mechanism, and practices, Parthasarthy, Biztantra

References

4.Mallin, A. Christine, Corporate governance, Oxford University press.

5. Bajaj and Aggarwal, Business ethics, Biztantra.

6. Crane &Matten, Business ethics, Oxford.

7. Prasad, corporate governance, PHI learning Pvt Ltd.

MBA II SEMESTER

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18MB2T07 TOURISM & HOSPITALITY MANAGEMENT

Course Outcomes - Identify and describe the inter-connectedness between the different components of the tourism industry. Identify and describe the different forms of tourism demand and the key factors influencing tourism demand, supply, and motivation. Describe the economic, environmental and social/cultural impacts of travel and tourism.

Course Content

Unit I - Understanding tourism - Introduction to tourism: themes, concepts and issues - The evolution and development of tourism - Understanding tourism demand - Understanding the tourist as a consumer

Unit II - Understanding the tourism industry - Understanding and managing tourism supply: an introductory framework - Information communication technologies and e-tourism - Travel intermediaries: tour operators and travel agents - Transporting the tourist - Visitor attractions - Tourism accommodation and hospitality services

Unit III - The impact of tourism - Economic impacts - Social and cultural impacts - Environmental impacts - The challenge of sustainability

Unit IV – Introduction to Hospitality Industry - The hospitality industry and you - Forces affecting growth and change in the hospitality industry - Hotel and lodging operations - Forces shaping the hotel business. The role of service in the hospitality industry - Industry organization: chain, independent, or franchise?

Unit V - Management in the hospitality industry - Management: a new way of thinking - Planning in hospitality management - Organizing in hospitality management - Staffing: human-resources management in hospitality management - Control in hospitality management - Leadership and directing in hospitality management - - Competitive forces in food service - Issues facing food service - On-site food service.

Textbooks

1. Stephen J. Page, & Joanne Connell. *Tourism: A Modern Synthesis*, 4th Edition, Cengage Learning EMEA, United Kingdom, 2014.

2. Charles R. Goeldner, & J. R. Brent Richie. *Tourism: Principles, Practices, Philosophies*, 12th Edition, John Wiley & Sons, Inc., New York, 2011.

Reference

3. Clayton W. Barrows, Tom Powers, & Dennis Reynolds, *Introduction to Management in the Hospitality Industry*, 10th Edition, John Wiley & Sons, Inc., New Jersey, 2012.

III SEMESTER

MBA III SEMESTER

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18MB3T01 STRATEGIC MANAGEMENT

Course objective

The Strategic Management course is designed to explore an organization's vision, mission, examine principles, techniques and models of organizational and environmental analysis, discuss the theory and practice of strategy formulation and implementation such as corporate governance and business ethics for the development of effective strategic leadership**.**

Course outcomes

This Course will create knowledge and understanding of management concepts principles and skills from a people, finance, marketing and organizational perspectives the development of appropriate organizational policies and strategies within a changing context to meet stakeholder interests information systems to learn from failure key tools and techniques for the analysis and design of information systems, including their human and organizational as well as technical aspects.

COURSE CONTENT

UNIT I

STRATEGY AND PROCESS

Conceptual framework for strategic management, the Concept of Strategy and the Strategy Formation Process – Stakeholders in business – Vision, Mission and Purpose – Business definition, Objectives and Goals - Corporate Governance and Social responsibility.

UNIT II

COMPETITIVE ADVANTAGE

External Environment - Porter's Five Forces Model-Strategic Groups Competitive Changes during Industry Evolution- Globalizations and Industry Structure - National Context and Competitive advantage Resources- Capabilities and competencies–core competencies-Low cost and differentiation Generic Building Blocks of Competitive Advantage- Distinctive Competencies Resources and

Capabilities durability of competitive Advantage- Avoiding failures and sustaining competitive advantage.

UNIT III

STRATEGIES 10

The generic strategic alternatives – Stability, Expansion, Retrenchment and Combination strategies - Business level strategy- Strategy in the Global Environment-Corporate Strategy Vertical Integration-Diversification and Strategic Alliances- Building and Restructuring the corporation- Strategic analysis and choice - Environmental Threat and Opportunity Profile (ETOP) - Organizational Capability Profile - Strategic Advantage Profile - Corporate Portfolio Analysis - SWOT Analysis - GAP Analysis - Mc Kinsey's 7s Framework - GE 9 Cell Model – Distinctive competitiveness - Selection of matrix - Balance Score Card.

UNIT IV

STRATEGY IMPLEMENTATION & EVALUATION

The implementation process, Resource allocation, Designing organizational structure-Designing Strategic Control Systems- Matching structure and control to strategy-Implementing Strategic change-Politics-Power and Conflict-Techniques of strategic evaluation & control.

UNIT V

OTHER STRATEGIC ISSUES

Managing Technology and Innovation - Strategic issues for Non Profit organizations. New Business Models and strategies for Internet Economy.

Relevant cases have to be discussed in each unit.

TEXTBOOK

1. Hill. Strategic Management : An Integrated approach, 2009 Edition Wiley (2012).
2. John A.Parnell. Strategic Management, Theory and practice Biztantra (2012).
3. Azhar Kazmi, Strategic Management and Business Policy, 3rd Edition, Tata McGraw Hill,2008

REFERENCES

1. Adriau HAberberg and Alison Rieple, Strategic Management Theory & Application, Oxford University Press, 2008.

2. Lawerence G. Hrebiniak, Making strategy work, Pearson, 2005.

3. Gupta, Gollakota and Srinivasan, Business Policy and Strategic Management – Concepts and Application, Prentice Hall of India, 2005.

4. Dr.Dharma Bir Singh, Strategic Management & Business Policy, KoGent Learning Solutions Inc., Wiley, 2012.

5. John Pearce, Richard Robinson and Amitha Mittal, Strategic Management, McGraw Hill, 12th Edition, 2012.

MBA III SEMESTER

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18MB3L02 DATA SCIENCE USING R

COURSE OBJECTIVES

In this course students learn how to program in R and how to use R for effective data analysis.. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, and organizing and commenting R code. Topics in statistical data analysis and optimization will provide working examples.

COURSE OUTCOMES

1. Implement the basic concepts and data structures of R.
2. Implement loops and functions in R
3. Implement mathematical functions and handling files
4. Apply the different distributions
5. Use various graphical tools in R
6. Describe the properties of discrete and continuous distribution functions

CONCEPTS TO BE COVERED:

Introduction, How to run R, R Programming Structures, Control Statements, Loops, , Functions, Recursion, Doing Math and Simulation in R, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files, Creating Graphs, Saving Graphs to Files, Probability Distributions, Correlation and Covariance, Linear Models.

LIST OF EXPERIMENTS:

Exercise 1: Introduction to R Programming
Exercise 2: Getting Used to R: working with Data Structures
Exercise 3: Using Conditional & Iterative Statements in R
Exercise 4: Working with functions
Exercise 5: Doing Math and Simulation in R Math Functions

- Calculus
- Linear algebraic operations
- Set operations•

Exercise 6: Reading in Your Own Data Working with files

- Accessing the Keyboard and Monitor,

Exercise 7: Data visualization Charts and plots

- Find the mean, median, standard deviation and quintiles of a set of observations.
- Students may experiment with real as well as artificial data sets.

Exercise 8: Probability Distributions. Generate and Visualize Discrete and continuous distributions using the statistical environment.

- Demonstration of Normal, binomial and Poisson distributions.
- Students are expected to generate artificial data using and explore various distribution and its properties. Various parameter changes may be studied.

Exercise 9: Correlation Calculate the correlation between two variables. Use the scatter plot to investigate the relationship between two variables

Exercise 10: Fitting a straight line of type y= a + bx

- A Statistical Model for a Linear Relationship
- The R Function: lm

TEXT BOOKS:

1) Statistical Learning using R, WHITTON
2) The Art of R Programming, A K Verma, Cengage Learning.
3) R for Everyone, Lander, Pearson
4) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCES:

1) R Cookbook, Paul Teetor, Oreilly.
2) R in Action, Rob Kabacoff, Manning

MBA III SEMESTER

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18MB3T03 OPERATIONS RESEARCH

COURSE OBJECTIVES

- To impart the basic concepts of modeling, models and statements of the operations research.
- Formulate and solve linear programming problem/situations.
- To solve transportation problems to minimize cost.
- Explain scheduling and sequencing of production.
- Apply Queuing theory to solve problems of traffic congestion, counters in banks, railway bookings etc.

COURSE OUTCOMES

At the end of the completion of this course the student will be able to

1: Formulate and solve the LPP with different methods.

2: Solve the transportation and assignment problems.

3: Understand the concept of game theory and to solve the problems in machine shop scheduling.

4: Understand and apply Queuing theory model and project scheduling techniques to real life problems.

COURSE CONTENT

UNIT I

Introduction to Operations Research (OR) & Linear Programming(LP): Nature & meaning of OR, management applications of OR, modeling in OR, principles of modeling, methods of solving OR models, characteristics of OR.

Problem formulation, Graphical method, Simplex method, Big-M method, Two–Phase Simplex method.

UNIT II

Transportation and Assignment Problems: Transportation problem – formulation, different methods of obtaining initial basic feasible solution –North West Corner rule, Lowest Cost Entry method, Vogel's Approximation method; Optimality method – Modified Distribution (MODI) method.

Assignment Problem – formulation, Hungarian method for assignment Problem, Travelling- Salesman problem.

UNIT III

Game theory: Optimal solution of two person zero sum games, the minimax (maximin) principle. Games without saddle points, mixed strategies. Dominance rule, algebraic solution and graphical method.

Sequencing: Introduction to Job shop Scheduling and flow shop scheduling, Solution of Sequencing Problem, Processing of n Jobs through two machines, Processing of n Jobs through m machines, graphical method.

UNIT IV

Project Management by PERT-CPM: Introduction, Basic steps, network diagram representation, rules for drawing network diagram, I-J rule, time estimates and critical path in network analysis, project evaluation and review technique.

UNIT V

Queuing Theory: Introduction – Terminology, Arrival Pattern, Service Channel, Population, Departure Pattern, Queue Discipline, Birth & Death Process, Single Channel Models with Poisson Arrivals, Exponential Service Times with finite queue length and non-finite queue length.

TEXT BOOKS

1. Sharma S.D., Operations Research: Theory, Methods and Applications, 15th Edition, Kedar Nath Ram Nath, 2010
2. Taha H.A., Operations Research, 9th Edition, Prentice Hall of India, New Delhi, 2010.

REFERENCE

1. Hiller F.S., and Liberman G.J., Introduction to Operations Research, 7th Edition, Tata McGraw Hill, 2010.
2. Sharma J.K., Operations Research: Theory and Applications, 4th Edition, Laxmi Publications, 2009.

MBA III SEMESTER

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18MB3T04 FINANCIAL MARKETS AND SERVICES

Course objective

The Course aims at providing the students, basic knowledge about the Finance concepts, markets and various services provided in those markets. The syllabus is structured in a way which provides adequate information about the roles of intermediaries and its regulating bodies. The course also provides information about the prevailing financial system in India.

Course outcomes

1 To basic knowledge about the finance concepts, markets and various services provided in those markets.
2 To provides adequate information about the roles of intermediaries and its regulating bodies. 3 To understand financial system in India.

COURSE CONTENT

Unit – I

Introduction - Overview of financial system in India – financial Concepts – Money market vs Capital Market – Composition of Money market – Money market Instruments – Recent developments in Money Market – **New Issue Market** – New issue vs Stock exchange – Methods of floating new issues – Guidelines and principal steps of a Public issue. Players in New issue market. Secondary Market – Stock Exchanges in India – Listing of securities – trading and settlement procedures – Online trading

Unit – II

Securities and Exchange Board of India - Malpractices in securities market – Deficiencies – SEBI Guidelines – Prohibition of Unfair trade practices – Investors protection – Measures – functions and working of OTCEI, NSE, BSE, MCE-SX – Depository system (NSDL, CDSL)

Unit – III

Financial Services: Merchant Banking in India – Services of merchant banks – Guidelines for Merchant bankers – Hire purchase origin and Development – Bank Credit for Hire purchase business – Concept of Leasing – Steps – Accounting treatment of lease – Method of Ascertaining Lease rentals – Discounting, Factoring and Forfeiting

Unit – IV

Venture Capital and Mutual Fund: The Indian Scenario of Venture Capital – Suggestions for the growth – Nitin Desai Committee's recommendations – Origin and types of Mutual Fund – risk involved in MF - NAV of MF – Performance evaluation of MF – Selection of MF – Reasons for slow growth.

Unit – V

Derivatives and Credit Rating: Derivatives – Kinds of Financial Derivatives – Forwards – Futures – Options – Swaps – Recent Developments – Indian Scenario – Credit rating in India – Credit rating New Symbols – Credit rating Agencies in India – SEBI guidelines 1999 - Practical Problems.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Vasant Desai: "Banks & Institutional Management", Himalaya Publishing House 2010.
2. Prasanna Chandra, "**Investment Analysis and Portfolio Management**", TMH, New Delhi,

REFERENCES

1. E. Gordon and K. Natarajan : **Financial Markets and Services**, Himalaya Publishing House, 2015
2. Bharti V. Pathak, "The Indian Financial System", Pearson Education [India] Ltd., Year 2006.
3. Meir Kohn, Financial Institutions and Market, Tata MC Graw-Hill Publication, Year-1999.

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MBA III SEMESTER

18MB3T05 SECURITY ANALYSIS & PORTFOLIO MANAGEMENT

COURSE OBJECTIVE

The students are able to know about investment environment and learn appropriate subject in Investment area like securities, stock market, portfolios, and mutual funds, making them masters and give their best at problem solving skills and decision making and participating in stock market.

COURSE OUTCOMES

1. To facilitate basic knowledge about investment, various sources of investment information.
2. To provides appropriate knowledge about various Fixed Income securities and their valuation.
3. To provide Knowledge in the area of Equity shares and valuation approaches of Equities.
4. To facilitate basic knowledge regarding Portfolio and portfolio theories.
5. To provide Knowledge in the area of Mutual Funds, Performance Evaluation of MF & Portfolios.

COURSE CONTENT

UNIT -I

Investment Analysis: Definition of investment, Investment Decision Process; Sources of investment information; Investment vs. Speculation; Factors to be considered in investment decision: Liquidity, Return, Risk, Maturity, Safety, Tax and Inflation. The concept and measurement of realized return and expected return. Ex-ante and ex-post returns.

Measurement of risk & Return, Approaches to investment analysis-Fundamental and Technical Analysis; Efficient Market Hypothesis.

UNIT -II

Valuation of Fixed Income Securities: - Analysis, Valuation and Management Features and types of debt instruments, Bond indenture, factors affecting bond yield. Bond yield measurement-Current yield, Holding Period Return, YTM, AYTM. Bond valuation: Bond-price theorems, Bond duration, Macaulay's duration and modified Macaulay's duration, Bond immunization.

UNIT-III

Valuation of Common Stocks: - Analysis and Valuation: Basic Features of Common Stock, Approaches to valuation–Dividend-discount model, Intrinsic Valuation.; Security Market Indexes, their uses; computational procedure of Sensex and Nifty.

UNIT -IV

Portfolio Theory & Analysis: Concept of portfolio. Portfolio return and risk. Harry Markowitz's Portfolio theory, construction of minimum risk portfolio, Sharpe single-index model. Capital market theory: Capital Market Line (CML), Security Market line (SML), Efficient Frontier. Capital Asset Pricing model (CAPM): over-pricing and under-pricing securities.

UNIT -V

Mutual Funds and Portfolio Evaluation: Mutual funds: genesis, features, types and schemes. NAVs, costs, loads and return of mutual funds. Performance measures- Sharpe's reward to variability index, Treynor's reward to volatility index, Jensen's differential index.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

TEXTBOOKS

1. Prasanna Chandra, "**Investment Analysis and Portfolio Management**", TMH, New Delhi,
2. Preeti Singh, "**Investment Management**", Himalaya Publishing House. New Delhi.

REFERENCES

1. Punithavathy Pandian, "**Security Analysis and Portfolio Management**", Vikas Publishing House,
2. V.K.Bhalla: "**Fundamentals of Investment Management**", S.Chand, New Delhi, 2013
3. **S.Kevin: "Security Analysis and Portfolio Management"** TMH, New Delhi, 2010
4. Sudhindra Bhat, "**Security Analysis and Portfolio Management**", Excel Books.32
5. Shashi and Rosy: "**Security Analysis and Portfolio Management Investment Management**", Kalyani Publishers, New Delhi.

MBA III SEMESTER

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18MB3T06 BANKING & INSURANCE MANAGEMENT

Course objectives

Understand the concept of banking, its significance, functions, bank nationalization and financial sector reforms. Know about different types of deposits and loans, principles of sound lending, forms of lending, subsidiary services and other contemporary services. Gain a comprehensive knowledge on the procedural formalities in dealing with different types of customers. Develop a perfect understanding of the procedure and precautions to be adopted by bankers in dealing with different types of securities. Competent in creating different types of charges and documentation in various types of Insurances.

Course outcomes

- To make the students understand the various services offered and various risks faced by banks.
- To make them aware of various banking innovations after nationalization.
- To give them an overview about insurance industry.
- To make the students understand various principles, provisions that govern the Life General Insurance Contracts.

COURSE CONTENT

UNIT I

Introduction to Banking: Introduction to Indian Financial System - Meaning of a Bank and Customer-Bank and customer Relationship - Role of commercial banks in Economic Development - Evolution of Banking in India – origin, nationalization, reforms and Financial Inclusion in India - Financial statements of banks with special focus on Indian banks - Financial statement analysis of banks: CAMEL Approach, Key Performance indicators Sources of Bank Funds.

UNIT II

Uses of Bank Funds: Features of Bank Credit - types of lending - assessment of credit worthiness of a prospective borrower - management of credit process - different types of loans and their features - Loan Pricing: The basic model, pricing fixed & floating rate loans, cost-benefit loan pricing, Customer Profitability Analysis - Non Performing Assets: - gross and net concept of NPAs, causes, implications & recovery of NPAs.

UNIT III

Regulation and Innovations in Banking System: Regulation of Bank Capital: The need to regulate Bank Capital - Concept of Economic Model - Concept of Regulatory Capital, Basel Accords I,II and III. Banc assurance, changing role of Banks as Financial Intermediaries. Customer service quality in Indian banking industry.

UNIT IV

Introduction to Insurance: Insurance as a Risk Management Tool- Principles of Insurance -Characteristics of Insurance contract - Functions of Insurers: Production, Underwriting, Rate Making, Managing Claims and Losses, Investment & Financing, Accounting & Record Keeping and other miscellaneous functions - Types of Insurers- Concept of Reinsurance, uses and advantages .

UNIT V

Life Insurance and General Insurance: The concept of Life Insurance - types of Life Insurance contracts - Tax treatment of Life Insurance- Life Insurance Products Classification of Life Insurance - The Actuarial Science- Provisions of Life Insurance contracts - Special Life Insurance forms - Health and General insurance–Overview, Types, Third Party Administrators- Micro Insurance in India.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Peter.S.Rose & Sylvia. C. Hudgins: “Bank Management & Financial Services”, Tata McGraw Hill New Delhi, 2010,
2. James S. Trieschmann, Robert E. Hoyt & David. W. Sommer B:“Risk Management & Insurance”, Cengage Learning, New Delhi

REFERENCES

1. Reddy K S and Rao R N: “Banking & Insurance”, Paramount Publishing House 2013.

2. Vasant Desai: “Banks & Institutional Management”, Himalaya Publishing House 2010.

3. Harold. D. Skipper & W. Jean Kwon: “Risk Management & Insurance, Perspectives in a Global Economy”, Blackwell Publishing New Delhi.

4. NIA: “Life Insurance Principles and Practices”, Cengage Learning, New Delhi, 2013

MBA III SEMESTER

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18MB3T07 CONSUMER BEHAVIOR AND ANALYSIS

Course objectives

The course deals with the behavioral aspects of marketing management. It explains how the markets, consumers behave under circumstances and how the cultural, social, personal and psychological factors influence their behavior. The course will enable students to develop marketing strategies that are consumer based and create and enhance customer value.

Course outcomes

1. Identify and explain factors which influence consumer behavior;
2. Demonstrate how knowledge of consumer behavior can be applied to marketing;
3. Display critical thinking and problem solving skills;
4. Gain, evaluate and synthesize information and existing knowledge from a number of sources and experiences;
5. In teamwork effectively to prepare a professional, logical and coherent report on consumer behavior issues within a specific context;

COURSE CONTENT

UNIT I

Consumer Behavior: Introduction to Consumer Behavior; Consumer Behavior and marketing Strategy, Methods of consumer research, analysis and applications in marketing. Contributing disciplines and areas. Diversity of consumers and their behaviors. Profiling and understanding the consumer needs. Segmentation , Consumer Decision making process and roles, Information Search Process; Evaluative criteria and decision rules. Are consumers Rational or emotional. Involvement theory and applications.

UNIT II

Determinants of CB: Perceptions Thresholds of Perception, and process dynamics.Social Class, Life Style, Profile of Social Class, and Application of CB Personality: Nature, Theories, self concept, psychographic and life style. Culture: Characteristics, and Cross Cultural Understanding. Attitude: Structural Model of Attitude, Attitude formation & Change. Motivation: Needs/Motives & Goals, Dynamic Nature of Motivation, Arousal of Motives, and Theories. Perceptual mapping methods, multi dimensional scaling. Consumer imagery.

UNIT III

Learning theories and their applications, Brand loyalty, Brand extensions. Conditioning theories, Cognitive learning theories; Concept and measurement of attitudes. Strategies of attitude change. Attribution theory and Cognitive dissonance. Persuasion and persuasibility.

UNIT IV

Consumer Decision Making Process: Routinised Response, Limited and Extensive
Problem Solving Behavior – Models of CB: Nicosia, Howard & Sheth, Engel-Kollat;
Diffusion of Innovation: Elements, Decisions, Adoption Categories and Process.
Family Decision Making – Environmental Influences on Consumer needs, theories of Motivation and their applications.

UNIT V

Marketing Research: Product Research, Advertising Research, Copy Testing, Test Marketing, Sales & Marketing effectiveness, Cool hunting, and Commercial Eye Tracking – Marketing research in India – Ethical Issues Involved in Marketing Research.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Assael, H. Consumer Behaviour and marketing Action, Ohio, South Western, 1995
2. Engle, J F etc. Consumer Behaviour, Chicago, Dryden Press, 1993 Electives (Mktg)

REFERENCES

1. Howard, John A etc. Consumer Behaviour in marketing Englewood Cliffs, New Jersey, Prentice Hall Inc.1989

2. Hawkins, D I etc. Consumer Behaviour Implications for Marketing Strategy. Texas, Business, 1995

3. Mowen, John C. Consumer Behaviour , New York, MacMillan, 1993

4. Schiffman, L G and Kanuk, L L Consumer Behaviour New Delhi, Prentice Hall of India, 1994

MBA III SEMESTER

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18MB3T08 DIGITAL & SOCIAL MEDIA MARKETNG

COURSE OBJECTIVES

To enable students to learn about Digital Marketing, advertising, and various types of advertising, internet marketing, email & mobile marketing, social media channels and get brand awareness and making them effective in developing digital media marketing strategies, decision making.

COURSE OUTCOMES

1. Understand the digital marketing strategies prevalent in today's business world.
2. Understand various mobile marketing apps like click to call, mobile advertising, SMS marketing.

COURSE CONTENT

UNIT-I

Introduction: Digital revolution in marketing - technology behind digital marketing – understanding digital customer – Digital marketing for startups. Introduction to digital Advertising: Objectives, emerging trends in Advertising.

UNIT-II

Internet marketing: Micro and macro environments of internet – Internet marketing strategy the internet and marketing mix – relationship marketing using internet interactive marketing communications – maintaining and monitoring online presence – B2C & B2B internet marketing.

UNIT-III

Email and Mobile marketing: Email strategy and planning – advantages and challenges of email marketing. *Mobile marketing*: the role of mobile in personal communication – mobile messaging channels – mobile commerce – mobile for online marketing – augmented reality – mobile analytics.

UNIT-IV

Strategy & Implementation: Market research: Online research strategies – cost and tools – digital data sources - content marketing strategy- design strategies – search engine optimization – The building blocks of marketing strategy – crafting marketing strategy.

UNIT-V

Social media Channels: Social networking – location and social media – tracking social media campaigns- Social media strategy: business challenges – opportunities and threats – online branding.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1 Richard Gay, Alan Charles worth and Rita Essen, Online Marketing, Oxford University Press, 2016.

REFERENCES

1. Dave Chaffey, Fiona Ellis-Chadwick, Richard Mayer, Kevin Johnston. Internet Marketing Strategy, Implementation and Practice,3rd Ed .Prentice Hall.
2. Rob Stokes e-Marketing: The essential guide to marketing in a digital world. 5th Ed. Quirk e-Marketing (Pty) Ltd.

MBA III SEMESTER

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18MB3T09 PROMOTION & DISTRIBUTION MANAGEMENT

COURSE OBJECTIVES

Globalization, increased competition, rapid transformation in communication & information technology and need for higher level of customer orientation have made sales and distribution management extremely important. The purpose of this course is to acquaint the students with the concepts which are helpful in developing and managing sales force and marketing channels so as to gain competitive advantage. The course is designed to familiarize students with the concepts, techniques and the practical aspects of the key decision making variables in distribution channel management.

COURSE OUTCOMES

1. Identify and respond to clients' advertising and marketing communications objectives by applying principles of marketing and communications.
2. Develop an advertising plan and present and defend it persuasively.
3. Contribute to evaluating the effectiveness of advertising and marketing communications initiatives.
4. Participate in the development of creative solutions to address advertising and marketing communications challenges.
5. Complete all work in a professional, ethical and timely manner.

COURSE CONTENT

UNIT I

Introduction to Promotional Management: Sales Display and Types Sales Promotion- Sales Promotion Objectives- Factors Influencing Sales Promotion- Tools of Sales Promotion- Sales Promotion Strategies- Sales Promotion and Consumer Behavior, Consumers Price Perceptions- Perceived Risk and Attitudes- Types of Promotion.

UNIT II

Introduction to Distribution Management: Physical Distribution Management- The Concepts of Total Distribution Costs and Cost Trade-offs- Customer Service Standards- Strategic Issues in Physical Distribution- Challenges and Opportunities- From Physical Distribution to Marketing Logistics- Major Logistics Functions

UNIT III

Marketing Channels: Nature and Importance of Marketing Channels- Emergence of Marketing Channel Structures- Types of Marketing Channels- Direct Marketing Channels vs Indirect Marketing Channels- Problems in Distribution- Selection of Distribution Channels- Channel Decisions

UNIT IV

Channel Institutions and Designing Channel System: Wholesaling- Agent Wholesaling Middle Man- Patterns in Wholesaling- Wholesaler Marketing Decision- Changing Patterns Channel Design Decisions- Channel Design Comparison Factors- Ideal Channel Structure Types of Channels- Implementation and Integration of Channel Design.

UNIT V

Ethical and Social Issues in Distribution Management: Business Ethics and Sales Management- Ethical Issues facing Sales Managers- Managing Sales Ethics- Modeling Ethical Behavior- Making Decisions on Ethical Problems- Building a Sales Ethics Programme International Distribution- Challenges in Managing an International Distribution Strategy.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. K. Shridhara Bhat: “Sales and Distribution Management”, Himalaya Publishing House, 2011.

2. Dr. Matin Khan: “Sales and Distribution Management”, Excel Books, New Delhi, 2005

REFERENCES

1. Pingali Venugopal: “Sales and Distribution Managment”, Sage Publications, New Delhi,2008.

2. Dr. S. L. Gupta: “Sales and Distribution Management”, Excel Books, 2010

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MBA III SEMESTER

18MB3T10 PERFORMANCE MANAGEMENT

COURSE OBJECTIVES

This course examines the importance of an effective performance management system in helping organizations define and achieve short and long term goals. It explains and reinforces the concept that performance management is not a one-time supervisory event, but an ongoing process of planning, facilitating, assessing, and improving individual and organizational performance. In addition, the course emphasizes the importance of measuring the effectiveness of human resource activities that are designed to enhance individual and organizational performance.

COURSE OUTCOMES

1. Systematically decide and communicate strategic performance aims, objectives, priorities and targets.
2. Plan effective performance management policies and practices to improve organizational and employee performance.
3. Devise and sustain arguments for using appropriate performance management techniques, rewards and sanctions to improve performance.
4. Demonstrate the communication skills required when managing achievement and underachievement.
5. Critically evaluate the effectiveness of performance management.

COURSE CONTENT

UNIT-I

INTRODUCTION TO PERFORMANCE MANAGEMENT

Definition, importance - Principles of Performance Management- Historical developments in Performance Management – Methods of Performance management processes for managing performance, Linkage of Performance Management to Other HR Processes

UNIT-II

PERFORMANCE MANAGEMENT PLANNING AND DEVELOPMENT

Introduction, Performance Management Planning, the Planning Process, Performance Agreement, Drawing up the Plan, Evaluating the Performance Planning Process

UNIT-III

PERFORMANCE APPRAISAL AND PERFORMANCE MANAGEMENT SYSTEM

Definitions and Dimensions of PA, Purpose of PA, Performance appraisal Vs Performance Management Performance Appraisal Process, Methods of performance appraisal, Periodic reviews, Functions of Performance Management System, Competency based Performance Management Systems, Reward based Performance Management Systems, Electronic Performance Management Systems

UNIT-IV

PERFORMANCE MONITORING AND COUNSELING

Supervision- Objectives and Principles of Monitoring- Monitoring Process- Periodic reviews- Problem solving- engendering trust Role efficiency- Coaching- Counseling and Monitoring- Concepts and Skills

UNIT-V

PERFORMANCE MANAGEMENT SKILLS

Operational change through performance management. High Performing Teams: Building and leading High performing teams – team oriented organizations – developing and leading high performing teams- Role of Leadership

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1 Prem Chadha: "Performance Management", Macmillan India, New Delhi, 2008.

2 Michael Armstrong & Angela Baron, "Performance Management": The New Realities, Jaico Publishing House, New Delhi, 2010.

REFERENCES

1 T.V.Rao, "Appraising and Developing Managerial Performance", Excel Books, 2003.
2 David Wade and Ronad Recardo, "Corporate Performance Management", Butter Heinemann, New Delhi, 2002.
3 Dewakar Goel: "Performance Appraisal and Compensation Management", PHI Leaarning, New Delhi, 2009

MBA III SEMESTER

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18MB3T11 WELFARE MANAGEMENT

Course objectives

To have an effective human resource practice, the knowledge of Labour Legislation is an indispensable part. Especially in the Indian scenario, the Labor welfare and security is paramount in industrial relations solutions. Thus to enable the students to have a good base in Labour Law, this paper focuses on various Labour legislations, dispute solving machineries and Judicial setup. There are modules with conceptual, descriptive, analytical, practical and legal aspects.

Course outcomes

1. Would be able to understand labor welfare aspects in India
2. Would understand the Indian legal environment which are protecting the workforce in Indian industry
3. Would be able to understand developmental programs for welfare of the workers.

COURSE CONTENT

UNIT I INTRODUCTION TO LABOUR WELFARE & LEGISLATION

Labour welfare Concept and Scope, principles, Theories of labour welfare, labour welfare practices in India, role of welfare in industry. Factories Act 1948, Mines Act 1952, Plantation Labour Act 1951, Contract Labour (Regulation and Abolition) Act 1970 and A.P.Shops and Establishments Act.

UNIT II INDUSTRIAL RELATIONS LEGISLATION

Industrial Disputes Act 1947; Industrial Employment (standing orders) Act 1946 and Trade Unions Act 1926.

UNIT III WAGE AND SOCIAL SECURITY LEGISLATION

Payment of wages Act 1936 - Minimum wages Act 1948 - Payment of Bonus Act 1966 -. Payment of Gratuity Act 1972 - Workmen's Compensation Act 1923 - Employees State Insurance Act 1948 - Maternity Benefit Act 1961 and Employees Provident Fund and Miscellaneous Provisions Act 1952.

UNIT IV LABOUR WELFARE

Concept, scope and philosophy, principles of labour welfare, Indian constitution on labour, Agencies of labour welfare and their role. Impact of ILO on labour welfare in India. Labour problems – Indebtedness, Absenteeism, Alcoholism, Personal and Family Counselling.

UNIT V LABOUR WELFARE PROGRAMMES

Statutory and non-statutory, extra mural and intra mural, Central Board of Workers' Education; Workers' Cooperatives; Welfare Centers, Welfare Officers' Role, Status and Functions. Role of social work in industry. Social Security: Concept, social security measures in India, social security schemes of industrial workers.

Relevant cases have to be discussed in each unit.

TEXT BOOK

1. Sharma A. M., "Aspects of Labour Welfare and Social Security", Himalaya Publishing House, Mumbai, 2014
2.Malik, P.L: "Industrial Law", Eastern Book Company. Laknow,1977

REFERENCES

1. Vaid K. N., "Labour Welfare in India", Sri Ram Centre for IR and HR, New Delhi, 2014.

2. Dr.SubbaRao, P., "Labour Welfare and Social Security", Himalaya Publishing House, Mumbai, 2013

3. Refer APPC prescribed text book PMIR&LW

MBA III SEMESTER

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18MB3T12 COMPENSATION MANAGEMENT

Course objective

To provide an insight to students with respective to Compensation management in organizations, including the role of human resources management in dealing with employees, and methods used to provide compensation.

Course outcomes

1. Student will be able to understand the compensation function
2. Student will be able to analyze, integrate, and apply the knowledge to solve compensation related problems in organizations
3. Recognize how pay decisions help the organization achieve a competitive advantage.

COURSE CONTENT

UNIT-I

INTRODUCTION TO COMPENSATION AND WAGE

Compensation: Meaning, Importance, principles, Factors and latest trends in compensation Wage: Meaning, Scope and Significance, Concepts of Wage, Salary & its Determinants.

UNIT-II

WAGE STRUCTURE

Principles of wage and salary administration, methods of wage determination in India, Pay Commissions, Preparation of Pay-Roll, Methods of wage fixation (Simple Problems).

UNIT-III

MANAGING EMPLOYEE COMPENSATION (BENEFITS)

Nature and types of benefits, employee benefits programs, security benefits, retirement security benefits, health care benefits, time–off benefits, benefits administrations, and employee benefits

required by law, discretionary major employee benefits, employee services designing a benefits package, Different types of incentives.

UNIT-IV

EXECUTIVE REMUNERATION

Elements of executive compensation, unique features of Executive Remuneration CEO's & other Executives compensation package, new developments in CEO's & other Executives compensation.

UNIT- V

INTERNATIONAL COMPENSATION

Global convergence of compensation practices - Pay for performance for global employees - practices in different industries - Employee benefits around the world - CEO's & other Executives pay in a global context.

Relevant cases have to be discussed in each unit.

TEXT BOOK

1 Milkovich, Newman & Gerhart, Compensation, TMH, 2011, 10th Edition
2 Dr.Kanchan Bhatia,Himalaya Publishing House

REFERENCES

1 Sharma,A.M., Understanding wage systems in India. Himalaya Publishing House. Mumbai: 2014.
2 Richard I. Henderson, Compensation Management in a Knowledge-Based World, Pearson Education, 2009, 10th Edition.

MBA III SEMESTER

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18MB3L13 DATA VISUALIZATION FOR MANAGERS

Course objective

This programme provides an exploratory tour of big data, data analytics, data science, machine learning and artificial intelligence. It introduces the various tools and techniques used by data science teams today. A roadmap of how to build an internal data science competency in an organization will be discussed. The programme provides exposure to building static and interactive graphics using Tableau and Python including a demonstration on the building of actual analytics models in Python.

Course outcomes

1. To familiarize the students with fundamental concepts of Data Visualization.
2. Students will learn and understand the basic tools used for visualizing data
3. Students will be able to demonstrate skills to use modern computing paradigms and computing platforms on data.

COURSE CONTENT

UNIT-I

Data Visualization: Ways of Representing Visual Data Techniques Used for Visual Data Representation, Types of Data Visualization, Applications of Data Visualization, Visualizing Big Data Tools Used in Data Visualization ,Tableau Products.

UNIT-II

Data Visualization Using Excel: Creating Combination of Charts, Creating a Combo Chart with Secondary Axis, Discriminating Series and Category Axis , Chart Elements and Chart Types, Data Labels, Quick Layout, Using Pictures in Column Charts, Band Charts, Thermometer Chart Gantt Charts, Waterfall Chart, Spark lines, Pivot Charts, Pivot Charts with Pivot Tables, Pivot Charts without Pivot Tables.

UNIT-III

Data Visualization with Python : Matplotlib Package: Interactive Graphs Vs Image Files, Saving Graphs to files . **Plotting Graphs:** Lines and Markers, Plotting Several Graphs on One Figure, Line Widths and Marker Sizes, Colors. **Controlling Graphs:** Axis, Grid and Ticks, Subplot, Erasing the Graph. **Adding Text:** Title, Axis Labels and Legend, Text Rendering, Mathematical Symbols and Expressions. **More Graph Types:** Bar Charts, Histograms, Pie Charts, Logarithmic Plots ,Polar Plots, Stem Plots, Additional Graphs, Getting and Setting Values, Patches.

UNIT-IV

Performing Graphical Analysis in R:

Using Plots, Using Plots for a Single Variable, Using Plots for Two Variables ,Saving Graphs to External Files, Advanced Features of R.

UNIT-V

Data Visualization with Tableau:

Introduction to Tableau Software ,Tableau Desktop Workspace ,Data Analytics in Tableau Public ,Using Visual Controls in Tableau Public, Overview of Tableau 9.0

TEXTBOOKS

1. DT Editorial Services. 2016. **Big Data Black Book**. Dreamtech Press.
2. Shai Vaingast. 2014. Beginning Python VisualizationCraftingVisual Transformation Scripts. 2nd Edition. Apress

SUGGESTED READING

1. White, Tom. 2012. **Hadoop: The Definitive Guide**. 3rd Edition. O'Reilly Media
2. Wes, Mc Kinny. 2012. **Python For Data Analysis.** 1st Edition. O'Reilly Media

MBA III SEMESTER

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18MB3L14 BUSINESS FORECASTING

COURSE OBJECTIVE

To introduce the student to time series models and associated forecasting methods, and show them how such models and methods can be implemented using R.

COURSE OUT COMES

Having successfully completed this module student will be able to:

- Students will have a command of business theory and practice in the field of business forecasting.
- Students who complete this course will demonstrate:
  a) Mastery of fundamental business forecasting concepts and ability to integrate and apply these concepts to resolve practical business problems.
  b) Proficiency at analyzing and interpreting numerical data to resolve practical business Forecasting problems.

COURSE CONTENT

UNIT I

Introduction to Forecasting: quantitative and qualitative methods; Time series models: decomposition, analysis and removal of trend, seasonality, and cycle;

UNIT II

Exponential Smoothing Methods: Single Exponential, Holt and Holt-Winters Methods;

UNIT III

Box-Jenkins Methods for ARIMA models;

UNIT IV

Simple and Multiple Regression Techniques;

UNIT V

Introduction to Innovations State Space models.

Text books

1. Hyndman, R.J. and Athanasopoulos, G (2013). Forecasting: Principles and Practice**.**

Reference

2. Business Forecasting, (2009) 9th Edition, John E. Hanke and Dean Wichern, Pearson

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MBA III SEMESTER

18MB3L15 MANAGEMENT INFORMATION SYSTEM

Course objective

1. To understand the basic principles and working of information technology.
2. Describe the role of information technology and information systems in business.
3. To contrast and compare how internet and other information technologies support business processes.
4. To give an overall perspective of the importance of application of internet technologies in business administration.

Course outcomes

1. Understand and apply the fundamental concepts of information systems.
2. Develop the knowledge about management of information systems.
3. Interpret and recommend the use information technology to solve business problems.
4. Apply a framework and process for aligning organization's IT objectives with business strategy.

COURSE CONTENT

UNIT-I

MIS and It's Role In Organizations: Open-Systems and Closed Systems D.S.S Its Relation to M.I.S, Characteristic Role of D.S.S as Different From M.I.S in an Organization, Expert DSS and Its Role as an Aid to Management Decision Process.

UNIT-II

Deterministic Models: Models Required to Cope With Uncertainty, Probabilistic Models and Fuzzy Sets, Fuzzy DSS and Fuzzy Expert DSS

UNIT-III

Application of DSS: Some Functional Areas of Management Like Finance, Marketing, Production Planning and Control Etc.

UNIT-IV

Non-Optimizing Models of DSS: Simulation Techniques and Monte- Carlo Methods.

UNIT-V

Application of DSS: Technical Feasibility and Financial Viability of DSS. Advantages and Limitations of DSS –Contemporary practices.

References

1. V.S. Janaki Raman: Decision Support System, PHI Learning, New Delhi,2009
2 Mallah: Decision Support and Data Warehouse Systems, TMH New Delhi, 2002
3 Turbon: DSS and Intelligent Systems, Pearson Education, 2010.
4 George M.Marakas: “Decision Support Systems in the 21st Century”, 2/e,Pearson Education, New Delhi, 2008.

MBA III SEMESTER

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18MB3T16 MICRO SMALL MEDIUM ENTERPRISE MANAGEMENT

COURSE OBJECTIVES

The objective of this course is to develop perspective and an appropriate understanding of startups and SMEs in the Indian Context, to make the understanding of the managerial dimensions of small business and startups, to enable students get equipped with necessary managerial skills for managing their enterprises in case of potentiality.

COURSE OUTCOMES

1. To learn about SMEs and Startups those are emerging in India.
2. To know about the Organization policies & process that would lead to the development of the company.
3. To identify the role of marketing conditions that are applicable through the support of people, it also focuses on HR roles in the organization.
4. The major role of the organization is to depend on the financial resources and support for the organization.
5. To make aware about the Production & Operations available for an Organization .

COURSE CONTENT

UNIT-I

Introduction: Definition and Meaning of Startups and SMEs — Role, Importance and their Present Status in Indian Economy — Factors Influencing their Emergence, Govt. Policies for Startups and SMEs in India — Problems and Challenges of Startups and SMEs — Managing Business Environment for SMEs — Management of Small Business Vis-à-vis Large Business.

UNIT-II

Managing Organization and Infrastructure**:** Design and Development of Organization Structure — Organization policies and processes – Managing Structure of a Successful Startup – Managing Ethics and Governance – Procurement of land and Building – Managing Expansion of Land and Building, Modernization and Technology up gradation, Management of Capital Expenditure – Management of advanced Technology.

UNIT-III

Managing Marketing and Human Resource**:** Scanning of Internal and External Environment — New Business Model Development Process — Identifying New Market Segment, New Distribution Channels, Promotional Tools, Managing New Age Marketing Tools, and Managing Digital Marketing – – Recruitment of Key Individuals —Manpower Planning and Sourcing — Developing and Managing Startup Team – Talent Management Practices in SMEs and Startups— Learning and Development of Productive employees in SMEs and Startups.

UNIT-IV

Managing Finance**:** Sources of Finance — Challenges of Managing Finance, Taxation and Costing (traditional costing versus activity based costing) — Financing by Commercial Banks —
Institutional Support to SMEs and Startups — Managing Finance from Venture Capitalists, Angel Investors and Private Equity — Managing Common Problems in Raising Finance.

UNIT-V

Managing Production and Operations: Production in Small Businesses Vis-a Vis Production in large Business, Size of the Plant, Process, Planning and Control of Production in SMEs and Startups – Managing Cost of Production – Managing the Utilization of Production Capacities – Managing Technical Knowhow – Managing Lean Startups – Risk Management Framework in SMEs and Startups.
Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ram Chandran, ‘Entrepreneurial Development’, Tata McGraw Hill, New Delhi
2. Saini, J. S., ‘Entrepreneurial Development Programmes and Practices’ , Deep & Deep Publications (P), Ltd.

REFERENCE

1. Khanka, S S. 'Entrepreneurial Development', S Chand & Company Ltd. New Delhi

2. Badhai, B 'Entrepreneurship for Engineers', Dhanpat Rai & co. (p) Ltd.

3. Desai, Vasant, 'Project Management and Entrepreneurship', Himalayan Publishing House, Mumbai, 2002.

4. Gupta and Srinivasan, 'Entrepreneurial Development', S Chand & Sons, New Delhi.

MBA III SEMESTER

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18MB3T17 VENTURE CAPITAL & PRIVATE EQUITY

Course objectives

The objectives of the course are to support the entrepreneurial talent by providing finance, to provide business management skills, and to get the returns in the form of capital gains. To understand the difference between venture capital, private capital, early stage and traditional financing sources those are used while starting a business. It also helps know different financing techniques for the student.

Course outcomes

1. To have an overview of Entrepreneurial Finance of Venture Capital.
2. To Know Valuation & outcomes of Venture Capital.
3. To understand the Conflicts of Interest and Litigation in the Venture Capital Industry.
4. To be aware about interactions between Private Equity Investors and Entrepreneurs.
5. To learn about emerging Trends in Private Equity Funding.

COURSE CONTENT

UNIT-I

Introduction to Venture Capital - Overview of Entrepreneurial Finance -Financing choices for startups Alternative- Forms of Venture Capital Venture- Capitalists Decision Making: An Information Processing Perspective Banks Versus Venture Capital in the Financing of New Ventures – Corporate Venture Capital Venture Capital Funding Angel Finance: The Other Venture Capital Business Incubation and its Connection to Venture Capital Philanthropic Venture Capital: A New Model of Financing for Social Entrepreneurs.

UNIT-II

Venture Capital Funding and Valuation: The Structure of Venture Capital Investments Financial Contracts and Venture Capitalists' Value-Added - Venture Capitalists, Monitoring and Advising Project

Externalities and Moral Hazard Doing It Not Alone: Antecedents, Dynamics, and Outcomes of Venture Capital Syndication.

UNIIT-III

Venture Capital Value-Added and Conflicts: Time to Grow Up: Large Sample Evidence on the Maturation Dynamics of Private Venture-Backed Firms How Do Venture Capitalists Create Value for Entrepreneurial Firms? Venture Capital and Innovation Reputation in Financial Intermediation: Evidence from Venture Capital Investor Opportunism, and Governance in Venture Capital – Conflicts of Interest and Litigation in the Venture Capital Industry –Venture Capital Exits and Returns

UNIT-IV

Private Equity and Angel Funding: Difference between Venture Capital, Private Equity and Angel Investing — Fund Organization and Structure of Private Equity companies (Overview) — Private Equity Activity, Growth, and Performance in India — Role of VC and PE for Innovation and Development of SMEs – Structure and Terms of Venture Capital and Private Equity Fund — Life Cycle of Private Equity Fund – Identifying Opportunities and Investment Decisions: Key Tools for Assessment, Valuation, Structuring and Terms – Interactions between Private Equity Investors and Entrepreneurs – Angel Financing for Entrepreneurs: Basics about Angel Investors, Looking for Angels and What Angels Are Looking for.

UNIT-V

Financing the Growth and Achieving Liquidity: Private Equity Funding Sources, Private Equity Funding Rounds, and Process of Financing Growth of their Portfolio Companies, Private Equity Investment Strategy —Constraints for private Equity Financing of Small and Medium Enterprises— Growth Financing and Exits — Collaborations with other Private Equity Firms — Emerging Trends in Private Equity Funding–Funds of Funds.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ram Chandran, 'Entrepreneurial Development', Tata McGraw Hill, New Delhi
2. Saini, J. S., 'Entrepreneurial Development Programmes and Practices' , Deep & Deep Publications (P), Ltd.

REFERENCE

1. Khanka, S S. 'Entrepreneurial Development', S Chand & Company Ltd. New Delhi

2. Badhai, B 'Entrepreneurship for Engineers', Dhanpat Rai & co. (p) Ltd.

3. Desai, Vasant, 'Project Management and Entrepreneurship', Himalayan Publishing House, Mumbai, 2002.

4. Gupta and Srinivasan, 'Entrepreneurial Development', S Chand & Sons, New Delhi.

MBA III SEMESTER

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18MB3T18 ENTREPRENEURSHIP & INNOVATION MANAGEMENT

Course objectives

Students acquire the knowledge and skills needed to manage the development of innovations, to recognize and evaluate potential opportunities to monetize these innovations, to plan specific and detailed methods to exploit these opportunities, and to acquire the resources necessary to implement these plans. Topics include entrepreneurial thinking; innovation management; opportunity spotting and evaluation; industry and market research; business strategy; business models and business plans; financial forecasting and entrepreneurial finance; pitching to resource providers and negotiating deals; and launching new ventures.

Course outcomes

1. Evaluate and utilize relevant theories and concepts underpinning resolution of innovation management problems.

2. Demonstrate capacity for dealing with complex real world innovation problems, including through effective project management.

3. Evaluate a range of leadership skills critical for sustainable, responsible innovation problem solving and project implementation.

4. Demonstrate an advanced ability to create, implement and evaluate management consulting practices within a major work-based innovation project.

COURSE CONTENT

UNIT I

Entrepreneurship: Importance and growth - Characteristics and Qualities of Entrepreneur- Role of Entrepreneurship, Ethics and Social Responsibilities. Women Entrepreneurship: Role &

Importance, Problems of Women Entrepreneurs – corporate entrepreneurship – mobility of entrepreneur – entrepreneurial motivation.

UNIT II

Training: Designing Appropriate Training Programme to inculcate Entrepreneurial Spirit - Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees. Creativity and Entrepreneurship: Sources and Methods of Ideas Planning and Development of Programmes

UNIT III

Planning and Evaluation of Projects: Growth of Firm – Project identification and selection - Factors inducing growth- - Project Feasibility Study - Post Planning of Project-Project Planning and Control.

UNIT IV

Meaning and Importance: Difference with creativity, invention and Discovery – Process-Typology – Innovation in Action like lateral thinking, out of box thinking, Disruptive ideas – Case Studies on Innovative business ideas like Red bus, Flipkart, Ola, Big basket etc.

UNIT-V

New ideas and opportunities: Developing business ideas, evaluating the opportunity – feasibility analysis – Developing business model. Business plan- meaning, significance and contents – Formulation and presentation – Common errors – Preparation of project report. Source of finance: Traditional and Non-traditional sources – venture capitalists, Angel investors, Private Equity cash.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Arya Kumar: “Entrepreneurship”, Pearson, Publishing House, New Delhi, 2012.
2. VSP Rao, Kuratko: “Entrepreneurship’, Cengage Learning, New Delhi,

REFERENCES

1. K.Ramachandran: “Entrepreneurship Development”, TMH, New Delhi, 2012

2.B.Janakiram, M Rizwana: “Entrepreneurship Development” Excel Books, New Delhi, 2011

3.Rajeev Roy: “Entrepreneurship”, Oxford University Press, New Delhi,2012

4. Vinnie jauhari & sudhanshu bhushan “Innovation Management” Oxford University press 2014

5. sholmomaital, Dvrseshabri “ Innovation Management” Response Books 2007

IV

SEMESTER

MBA IV SEMESTER

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18MB4T01 LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Course objective

The objective of this course is to gain the knowledge of possibilities of efficient optimization and management of operation in logistics and supply chain management and also the ability to apply them in the enterprise reality.

Course outcomes

1. Analyze the manufacturing operations of a firm.
2. Apply sales and operations planning, MRP and lean manufacturing concepts.
3. Apply logistics and purchasing concepts to improve supply chain operations.
4. To Understand the supply chain system network, distribution channels.
5. Apply quality management tools for process improvement.

COURSE CONTENT

UNIT I

Logistics and Competitive Strategy: Competitive advantage – Gaining Competitive advantage through logistics-Integrated supply chains– Competitive performance - Models in Logistics Management - Logistics to Supply Chain Management – Focus areas in Supply Chain Management.- Customer service and retention- Basic service capability Value added services

UNIT II

Measuring Logistics costs and Performance: The concept of Total Cost analysis – Principles of logistics costing – Logistics and the bottom-line – Impact of Logistics on shareholder value - customer profitability analysis –direct product profitability – cost drivers and activity-based costing.

UNIT III

Logistics and Supply Chain Relationships: Benchmarking the logistics process and SCM operations –Mapping the supply chain processes – Supplier and distributor benchmarking – setting benchmarking priorities –identifying logistics performance indicators –Channel structure -Economics of distribution –channel relationships –logistics service alliances.

UNIT IV

Sourcing, Transporting and Pricing Products: sourcing decisions and transportation in supply chain – infrastructure suppliers of transport services – transportation economics and pricing – documentation - pricing and revenue management Lack of coordination and Bullwhip Effect - Impact of lack of coordination. - CRM –Internal supply chain management - .

UNIT V

Managing Global Logistic: Logistics in a global economy – views of global logistics- global operating levels – interlinked global economy – Global strategy –Global purchasing – Global logistics – Channels in Global logistics –Global alliances.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Sahay B.S, *Supply Chain Management for Global Competitiveness*, Macmillan India Ltd., New Delhi.
2. Reguram G, Rangaraj N, *Logistics and Supply Chain Management Cases and Concepts*, Macmillan India Ltd., New Delhi..
3. Coyle, Bradi&Longby, *The Management of Business Logistics*, West Publishing Co. Martin Christopher, *Logistics and Supply Chain Management*

REFERENCES

1.Donald J.Bowersox and David J.Closs: “Logistical Management” The Integrated Supply Chain Process, TMH, 2011.

2.Edward J Bradi, John J Coyle: " A Logistics Approch to Supply Chain Management, Cengage Learning, New Delhi, 2012.

3. D.K.Agrawal: "Distribution and Logistics Management", MacMillan Publishers, 2011

4. Sunil Chopra and Peter Meindl: "Supply chain Management: Strategy, Planning and Operation", Pearson Education, New Delhi 2013

5. Rahul V Altekar: Supply Chain Management, PHI Learning Ltd, New Delhi, 2009

MBA IV SEMESTER

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18MB4T02 LEGAL ASPECTS OF BUSINESS

Course objective

To provide a basic understanding of various statutory provisions that confronts business managers while taking decisions.

Course outcomes

1. Explain the concepts in business laws with respect to foreign trade
2. Apply the global business laws to current business environment
3. Analyze the principle of international business and strategies adopted by firms to expand Globally.
4. Integrate concept of business law with foreign trade

COURSE CONTENT

UNIT I

Importance of Commercial Law: The Indian Contracts Act, 1872 – Nature of the Act and Classification of Contracts – Essentials of a Valid Contract – Offer and Acceptance – Capacity – Consideration –Free Consent –Legality of Object –Performance of a Contract – Discharge of a Contract – Breach of a Contract and Remedies.- Intellectual Property Laws

UNIT II

Sales of Goods Act: Distinction between Sales and Agreement to Sell – Conditions and Warranties – Performance of Contract of Sale –Transfer of Ownership – Rights of an Unpaid Seller. Consumer Protection Act, 1986: Consumer Right –Machinery for Redressal of Consumer Grievances.- Information Technology Act 2000.

UNIT III

Contract of Agency: Kinds of Agents –Creation of Agency- Duties and Rights of Principal and Agents- Principal's Liability for the Acts of the Agent-Liability of Agent –Termination of Agency.

Negotiable Instruments Act, 1881- Kinds of a Negotiable Instruments and endorsement- Presentation and discharge of Negotiable Instrument.

UNIT IV

Indian Partnership Act, 1932: Meaning and Essentials of Partnership- Registration – Tests of Partnership-Duties and Rights of Partners – Dissolution of Partnership.

UNIT V

Company Act 1956: Nature and Types of Companies – Formation – Memorandum of Association-Articles of Association –Kinds of Shares –Duties of Directors-Winding up.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ravindra Kumar: "Legal Aspects of Business", Cengage Learning, New Delhi, 2011
2. Kuchhal M C, Deepa Prakash: "Business Legislation for Management", Vikas Publishing House, New Delhi, 2012

REFERENCE

1. Pathak: "Legal Aspects of Business", Tata McGraw Hill, New Delhi, 2010
2. S.N.Maheshwari, S.K.Maheshwari: "A Manual of Business Laws", Himalaya Publishing House, 2013.
3. P.K.Padhi: "Legal Aspects of Business", PHI Learnings, New Delhi, 2013

MBA IV SEMESTER

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18MB4T03 ENTREPRENEURSHIP & PROJECT MANAGEMENT

COURSE OBJECTIVES

The course objective is to promote first generation businessman and industrialists with availability of the resources nearer to him. It also encourages self-employment tendencies through government plans and programs. There has been successful development and implementation of all projects' procedures through productive guidance, efficient communication with apt supervision.

COURSE OUTCOMES

1. To understand about the Entrepreneurship by various characteristics, functions and its types.
2. The role of women entrepreneurship with the support of various schemes helped by the government.
3. Meaning of Project Management with its phases of life cycle along with the project manager.
4. Project planning, formulating and preparing a specimen project.
5. Investment issues and institutional support for the project.

COURSE CONTENT

UNIT I

Meaning of Entrepreneurship - characteristics, functions and types of entrepreneurship - Intrapreneur - Role of entrepreneurship in economic development- Startups and Entrepreneurs – Key Elements of Entrepreneurial Ecosystem – Opportunities and Challenges – Changing Business Landscape in India during 2000-2015- – corporate entrepreneurship – mobility of entrepreneur – entrepreneurial motivation

UNIT II

Women Entrepreneurship: Role & Importance, Problems of Women Entrepreneurs-– Entrepreneurial Motivation, Performance and Reward – Government Policy & Regulations- Incentives and Subsidies – Support Entrepreneurship through Entrepreneurship Hubs (E- Hubs) – Listing Rules for Startups.

UNIT III

Project Management: Meaning of project - concepts - categories - project life cycle, phases - characteristics of a project – project manager - role and responsibilities of project manager.

UNIT IV

Project identification - selection - project formulation – contents of a project report - planning commission guidelines for formulating a project - specimen of a project report.

UNIT V

Source of finance for a project - Institutional finance supporting projects project evaluation - objectives - types - methods.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ram Chandran, 'Entrepreneurial Development', Tata McGraw Hill, New Delhi
2. Saini, J. S., 'Entrepreneurial Development Programmes and Practices' , Deep & Deep Publications (P), Ltd.

REFERENCE

1. Khanka, S S. 'Entrepreneurial Development', S Chand & Company Ltd. New Delhi
2. Badhai, B 'Entrepreneurship for Engineers', Dhanpat Rai & co. (p) Ltd.
3. Desai, Vasant, 'Project Management and Entrepreneurship', Himalayan Publishing House, Mumbai, 2002.
4. Gupta and Srinivasan, 'Entrepreneurial Development', S Chand & Sons, New Delhi.

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18MB4T04 RISK MANAGEMENT & DERIVATIVES

Course objective

The students are able to learn about Derivatives Market, participants, and various types of players in stock & derivatives market, making them effective in developing strategies for participating, decision making and managing risk.

Course outcomes

1. To understand and analyze derivatives products to generate an optimal risk management strategy.
2. To facilitate knowledge about risk management & measurement in investment decision making process.
3. To Demonstrate and understanding of pricing forwards, futures and options contracts.
4. Generating critical thinking, analytical and problem solving skills in the context of derivatives pricing and hedging practice.
5. By using the binomial option pricing model and its extension in continuous time to the Black-Sholes Model.

COURSE CONTENT

UNIT –I

Introduction to Derivatives: The concept and importance of Derivatives and types of Derivatives. The role of Derivative securities to manage risk and to exploit opportunities to enhance returns. Players in the stock/ derivative market: Individuals, speculators, hedgers, arbitrageurs and other participants in Derivatives Market.

UNIT-II

Risk Management & Measurement: Concept, nature and scope of risk. Possible risk events and risk indicators. Risk Management Process. Types of risk: Product market risk and capital market risk. Risk in Financial Institutions, Risk reporting process–internal and external, methods of Risk management. Measurement of Risk**:** Measurement of Market risk, Interest rate Risk, Liquidity Risk

UNIT-III

Forward contracts: Definition, features and pay-off profile of Forward contract, Valuation of forward

contracts. Forward Contracts to manage Commodity price risk, Interest rate risk and exchange rate risk-limitations of Forward contract.

Futures contracts: Definition of future contracts. Clearing house, margin requirements, marking to the market. Valuation of futures contracts. Risk management with Futures contracts–the hedge ratio and the portfolio approach to a risk–minimizing hedge.

UNIT-IV

Options: Definition of an option. Types of options: call option, put option, American option and European option. Options in the money, at the money and out of the money. Option premium, intrinsic value and time value of options. Pricing of call and put options at expiration and before expiration. The Binominal option pricing model (BOPM): assumptions - single and two period models. Black-scholes option pricing model (BSOPM).

UNIT –V

SWAPS; Definition, types of swaps. Interest rate swaps, Currency swaps. Mechanics of Interest rate swaps .Using Interest rate Swaps to lower borrowing costs, hedge against risk of rising and falling interest rates. Valuation of interest rate Swaps. Pricing of Interest rate swaps. Currency Swaps: Types of Currency Swaps. Valuation of currency swaps. Pricing of currency swap.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. **Rajiv Srivastava**:"Derivatives Valuation and Risk Management", Oxford University Press.2012
2. **Dhanesh Kumar Khatri**: "Derivatives and Risk Management" MacMillon,2012

REFERENCES

1. **Jayanth Rama Varma**: "Derivatives and Risk Management", TMH, 2012
2. **Vivek, P.N.Asthana**: "Financial Risk Management", HimalayaPublishing House,2012

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18MB4T05 TAX MANAGEMENT

COURSE OBJECTIVE

Indian taxation policy has some non-revenue objectives. Truly speaking, in the modern world, taxation is used as an instrument of economic policy. It affects the total volume of production, consumption, investment, choice of industrial location and techniques, balance of payments, distribution of income, etc. The objective is learning the concepts on direct tax assessment by the learner.

COURSE OUTCOMES

1. Define the procedure of direct tax assessment.

2. Able to file IT return on individual basis.

3. Able to compute total income and define tax complicacies and structure.

4. Able to understand amendments made from time to time in Finance Act.

5. Differentiate between direct and indirect tax assessment.

COURSE CONTENTS

UNIT I

Introduction: Income Tax Act 1961 Definitions- Residential status- Heads of Income - Computation of Taxable Income.

UNIT II

CENVAT: Input Goods and Services for CENVAT- Capital Goods for CENVAT- Exempted Final Products- Customs Duty- Basic Concepts- Nature of Customs Duty- Classification of Customs Duty- Exemptions & Valuation of Customs Duty.

UNIT III

Taxation of Companies: Special Provisions in Computation of Profits from Business- Deductions from Gross Total Income- Minimum Alternate Tax on Companies- Special Provisions relating to Tax on Distributed Profits of Domestic Companies.

UNIT IV

Tax Planning: Concepts relating to Tax Avoidance and Tax Evasion- Tax Planning- Tax considerations in respect of specific managerial decisions like Make or Buy, Own or Lease- Close or Continue - Sale in Domestic Markets or Exports- Investment Decisions on Tax Planning.

UNIT V

Tax Management: Filing of Returns and Assessments- Penalties and Prosecutions- Appeals and Revisions- Advance Tax- TDS- Advance Rulings- Avoidance of Double Taxation Agreements.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ahuja, G. K. & Gupta, Ravi, Systematic Approach to Income Tax. Allahabad, Bharat Law House.

2. Bhagwati Prasad, Direct Taxes Law & Practice, Wishwa Prakashan.

REFERENCE

1.R.N. Lakhotia, Corporate Tax Planning, Vision Publications

2. Singhania, V.K. Direct Taxes: Law and Practices. Delhi, Taxman.

3. Srinivas E. A., Handbook of Corporate Tax Planning, New Delhi, Tata McGraw Hill.

4. Vinod K. Singhania & Mounica Singhnia, Corporate Tax Planning & Business Management, Taxmann Publications.

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18MB4T06 STRATEGIC FINANCIAL MANAGEMENT

COURSE OBJECTIVE

To acquaint the students with concepts of financial management from strategic perspective and familiarize various Techniques and Models of Strategic Financial Management.

COURSE OUTCOMES

1. Consolidate knowledge of and apply the technical language and practices of financial management;
2. Undertake sophisticated financial analysis with regard to Corporate valuation, interest rate and currency risk management and present the information in an appropriate format;
3. Evaluate, synthesize and apply the contemporary theories and empirical evidence concerning Financial Management to a range of problems and situations;
4. Critically evaluate the impact of macro economics and recognize the role of international financial institutions in the financial management of multinationals.

COURSE CONTENT

UNIT – I

Financial Policy and Strategic Planning –Strategic Planning Process – Objectives and Goals – Major Kinds of Strategies and Policies – Corporate Planning – Process of Financial Planning – Types of Financial Plan – Financial Models – Tools or Techniques of Financial Modeling – Uses and Limitations of Financial Modeling – Applications of Financial Models – Types of Financial Models - Process of Financial Model Development.

UNIT – II

Investments Decisions under Risk and Uncertainty – Techniques of Investment Decision – Risk Adjusted Discount Rate, Certainty Equivalent Factor, Statistical Method, Sensitivity Analysis and Simulation Method – Corporate Strategy and High Technology Investments.

UNIT – III

Expansion and Financial Restructuring – Corporate Restructuring - Mergers and Amalgamations – reasons for Merger, Benefits and Cost of Merger – Takeovers – Business Alliances – Managing an Acquisition – Divestitures – Ownership Restructuring – Privatization – Dynamics of Restructuring – Buy Back of Shares – Leveraged Buy-outs (LBOs) – Divestiture – Demergers.

UNIT – IV

Leasing – Importance, Types, Tax Considerations, and Accounting Considerations – Evaluation of Lease from the point of view of Lessor and Lessee – Lease versus Buy Decision – Venture Capital – Concept and Developments in India – Process and Methods of Financing – Fiscal Incentives.

UNIT – V

Financing Strategy - Innovative Sources of Finance – Asset Backed Securities - Hybrid Securities namely Convertible and Non-Convertible Debentures, Deep Discount Bonds, Secured Premium Notes, Convertible Preference Shares – Option Financing, Warrants, Convertibles and Exchangeable Commercial Paper.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Jeff Madura, " International Financial Management" Cengage Learning Limited, 2008.

2. PG Apte, "International Financial Management" Tata McGraw Hill Limited, 2009.

3. Vyuptakesh Sharan, "International Financial Management" PHI, 2012.

4. V.A. Avadhani, "International Financial Management" Himalaya Publishing House, 2009

REFERENCE

1. Rajni Sofat & Preeti Hiro, Strategic Financial Management, PHI, Delhi, 2011

2.Weaver & Weston, Strategic Corporate Finance, Cengage Learning, Delhi, 2001

3.Chandra, Prasanna, Financial Management, Tata McGraw Hill, Delhi.

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18MB4T07 INTERNATIONAL MARKETING MANAGEMENT

COURSE OBJECTIVE

The objective of the course is to provide students with a perspective of International Marketing Management, its environment and complexities.

COURSE OUTCOMES

1. To interpret the special characteristics of an international knowledge-intensive environment and innovations and their role in marketing decision-making.
2. To apply different marketing tools and strategies in the context of technology and knowledge-intensive markets and how to analyze and criticize firms' strategic marketing decisions in these markets.
3. To develop your competencies in analytical skills, intercultural issues and combining business and technology.
4. To apply different marketing tools and strategies in the context of technology.

COURSE CONTENT

UNIT-I

Introduction to Global Marketing: Scope and Significance of global Marketing, - Difference Between global and domestic marketing – The growing attractiveness of developing country market – International orientations, Stages of internationalization, Driving and restraining forces of global markets, Participants in international marketing

UNIT-II

International Marketing Strategy: Entry strategies in Global markets – modes of entries in global markets global market segmentation – international targeting – criteria for targeting,selecting a global target market – Global product positioning strategy. Business Customs inglobal Market – strategies for FDI and FIIs - Entry Strategies of Indian Firms

UNIT III

Global Product & Price Management: International product mix – Managing Global Research and Development for product management– Product diffusion and adoption in global markets -International Product Life Cycle – Product and culture – Global brand leadership – :Environmental influences on Pricing Decisions – Grey Market goods – Transfer pricing – GlobalPricing – Policy Alternatives – Constraints on global pricing

UNIT IV

Global Marketing Channels and Promotion for Global Markets: channels – Innovations in global channels – Channel strategy for new market entry – Distribution Structures – Global Distribution Patterns – Challenges in Managing An Global Distribution Strategy – Selecting Foreign Country Market intermediaries - Global Advertising and branding - Export Policy Decisions of a firm - Export costing and pricing – EXIM policy of India.

UNIT V

Export Procedures and Documents: Preliminaries: inquiry and offer – confirmation of offer –export license – finance – production /procurement of goods – shipping space – packing and marketing – quality control and pre – shipment inspection – excise clearance – customs formalities – negotiation and documents – standardization and aligned pre-shipment documents – documents related to goods – documents related to shipments.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Francis Cherunilam: International marketing, 11th Edition, Himalaya Publication House, 2010
2. Warren J Keegan: Global Marketing Management, 5th Edition, Prentice Hall of India Private Limited.

REFERENCE

1. Philip R. Cateora, John L. Graham: International Marketing 11/e, Tata McGraw-Hill Co. Ltd., 2002.

2. R.Srinivasan: International Marketing, Prentice-Hall of India Pvt. Ltd., 2010

3. U.C Mathur: International Marketing Management, Sage Publications, New Delhi 2008

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18MB4T08 CUSTOMER RELATIONS & SERVICES MARKETING

COURSE OBJECTIVE

To enable students to understand the comprehensive set of processes and technologies for managing the relationships with potential and current customers and business partners across marketing, sales, and service areas regardless of the channel of distribution.

COURSE OUTCOMES

1. To create insight and new learning in the area of customer relationship management.

2. To equip students with both a conceptual understanding and the knowledge pertaining to practical application of critical skills necessary for building and managing partnering relationships with customers and suppliers.

3. To discuss the conceptual foundations of relationship marketing and its implications for further knowledge development in the field of business.

COURSE CONTENT

UNIT I

Customer Relationship Management: Introduction, Meaning and Definition of CRM, Importance of CRM, Concept and Growth of Relationship Marketing, Scope of Relationship Marketing, concept of Lifetime Customer and Customer Loyalty, Benefits and difficulties of CRM

UNIT II

CRM Process and Implementation: Introduction, Customer Development Process, customer Retention, Customer satisfaction, Importance of customer retention, Customer Retention Strategies, Customer Life Time Value, types of Relationship Management, CRM process for B2B markets

UNIT III

Services Marketing: Introduction, concept and evolution of services marketing, meaning of service marketing, myths encountered in services, need for service marketing, and growth in Services Marketing. Services Marketing Mix and Gaps Model Introduction, 7Ps of service marketing, service gaps framework, perceived service quality, models of service marketing.

UNIT IV

Marketing of Services: Introduction, Overview of Different Service Sectors, Marketing of Banking Services, Marketing in Insurance Sector, Marketing of Education Services, Marketing of Tourism and Airlines, Tourism marketing, Airlines marketing, marketing of Hospitality Services, Healthcare Marketing, Social Service by NGOs, Marketing of Online Services, Marketing of Professional Services

Unit V

Emerging Issues in Service Marketing : Introduction, Strategic approach in Services Marketing, Service Marketing in e-Commerce and e-Marketing, and Telemarketing Services, Service Marketing Research for Global Markets and Rural Markets, Innovations in Services Marketing, Ethical Aspects in Service Marketing

Relevant cases should be discussed from each unit

TEXTBOOKS

1. S.Shanmuga sundaram: “Customer Relationship Management” Prentice Hall of India.
2. Dr. S. Shajahan: Services Marketing, Himalaya Publishing House, New Delhi 2009.

REFERENCES

1. Ed Peelen: “Customer Relationship Management” Pearson, Education
2. Roger J Baran, Robert J Galka and Daniel P Strunk: “Customer Relationship Management” Cengage learning
3. Rajendra Nargundkar: “Services Marketing”, Tata McGraw Hill, New Delhi, 2011.
4. S.M. Jha: Service Management and Marketing, Himalaya Publishing House, New Delhi,2011
5. C. Bhattacharjee: Services Marketing, Excel Books, New Delhi, 2010

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18MB4T09 RETAIL MANAGEMENT

COURSE OBJECTIVE

This course will enable students to develop decision making skills related to retailing. Topics may include Theories of Retail Development, Innovative Business Models in Indian Retailing, Strategic Retail Planning Process, and Financial Strategies in Retailing, Process of Merchandise Planning, and control.

COURSE OUTCOMES

1. Understand the impact of retailing on the economy.
2. Comprehend retailing's role in society and, conversely, society's impact on retailing.
3. See how retailing fits within the broader disciplines of business and marketing.
4. Recognize and understand the operations-oriented policies, methods, and procedures used by successful retailers in today's global economy.
5. Know the responsibilities of retail personnel in the numerous career positions available in the retail field.

COURSE CONTENT

UNIT I

Introduction to Retailing: Concept, Meaning, Nature, Scope and Importance, and Functions of Retailing – Overview of Global Retailing – Growth and Development of Indian – Theories of Retail Development – Retail organization Structure – Types of Retailing: Store Based and Non-store Based Retailing, Retail Consumer Purchase Decision Making Process – Concepts of Cross shopping, and Cross-buying Behavior – Opportunities and Challenges of Retailing in India – Innovative Business Models in Indian Retailing.

UNIT II

Retail Market Strategy: Concept, Definition, and Need for Retail Market Strategy –Developing a Sustainable Competitive Advantage – Strategic Retail Planning Process –Retail Growth Strategies: Opportunities and Challenges for Domestic and International Expansion – Retail Location: Concept, Types, and Importance of Retail Location – Retail Location Theories – Retail Location Process – Retail Location and Retail Strategy – Retail Site Selection: Local, Legal, and Market Potential Considerations.

UNIT III

Retail Management: Concept, Scope and Process of Retail of Management – Retail HRM:
Policies, Practices, and Managing of Human Resources in Retailing Business – Financial Strategies in Retailing: Objectives and Goals – Strategic Profit Model – Financial Performance Assessment in Retailing – Retail Merchandising: Process of Merchandise Planning, and Methods of Merchandise Procurement – Category Management – Emergence of Private Labels (Store Brands).

UNIT IV

Retail Pricing: Policies, and Strategies of Retail Pricing – Techniques for Increasing Retail Sales – Retail Promotion Mix: Retail Advertising and Sales Promotions – In-store Pricepromotions – Retail Communication Budget: Process and Methods of Budgeting – Emergence of Multichannel Retailing: Issues and Challenges – Integrating and Controlling Retail Strategy.

UNIT V

Retail Customer Services Concept, Scope and Importance of Store Management – Store Layout, Design, Atmospherics, and Visual Merchandising ,Service Quality, Complaint Handling, Satisfaction, Loyalty, and Retention Strategies & Ethical Issues in Retailing .

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. . Chetan Bajaj, Rajnish Tuli and Srivatsva, Retail Management, Oxford University Press
2. Swapna Pradhan, Retailing Management Texts & Cases McGraw Hill Companies.
3. A.J.Lamba, The art of Retailing, TMH.

REFERENCE

1. Andrew J Newmann & Petes cullen, Retailing Management, Thomson Learning.

2. Barry Berman Joel &R Evans, Retailing Management A Strategic Approach, Pearson Education.

3. Gilbert, Retail Marketing Management, Pearson Education.

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18MB4T10 LEADERSHIP MANAGEMENT & TEAM DYNAMICS

COURSE OBJECTIVES

The students will be able to understand the consequences on performance and reflect on the implications of daily decisions made as managers and leaders. To create new, unpredictable situations that lends themselves to chaotic outcomes causing participants to exhibit new leadership abilities. To experience new awareness of their needs and how to meet them through team effort and "out of the box" thinking.

COURSE OUTCOMES

1. To understand psychological and social-psychological contexts of organization.
2. To understand individual, group and organization factors associated with leadership.
3. Acquisition of critical thinking and skills regarding work with people and their leadership.
4. To develop an understanding of change processes, obstacles to change and decision making
5. To develop interpersonal and intrapersonal competence.

COURSE CONTENT

Unit I

Leadership – Definition, concept and components of leadership. Theories of leadership, Personal characteristics for effective leadership, Leader and values, identity and integrity of leader. Organizational Leadership: Situational Leadership models, Emerging Leadership models, Leadership Effectiveness: Reddins' 3-D Model, Hersey and Blanchard Situational Model.

Unit II

Leadership Motivation, Culture: Motivation: Sources of motivation, stimulation tools, motivation and performance, aspirations, work satisfaction, Major Theories of motivation(3), motivation program in

organization. Organizational Culture: Meaning, Definitions, Significance, Dimensions, Managing Organizational Culture, Changing organizational Culture, Intercultural aspects of leadership.

Unit III

Leadership Development: Continuous Learning for effective leadership, Alignment of organizational goals and leaders goals. Leadership Attitude: significance – development. Skills for leadership development: Goal setting, support of employee development and communication of feedback; delegation; solving of conflict situations and negotiation. Couching and mentoring. Emotional intelligence and its significance in the role of leader. Handling emotions and stress. Relation between Leader and followers, LMX theory, Gender and leadership, Leadership and power, Personal risk of leader.

Unit IV

Cross Cultural Leadership: Influence of leadership on organizational culture, Leadership in the cross cultural context and its challenges, GLOBE research program of Wharton School, Global perspectives of leadership – Leadership in USA – Leadership in Japan – European leadership – Leadership in Arab countries – Implications of global leadership – Leadership and Corporate Social Responsibility across globe.

Unit V

Team Dynamics: Leadership and Team Building: Principles of team building, individual versus Group versus Teams – Leadership and Integrity: Developing character and values. Leadership of workgroups and teams, Group structure and dynamics, Individual in a group, Formation of teams and team work, Group problem-solving, Team excellence, Social perception of teamwork in organization.

Relevant cases have to be discussed in each unit.

Text Books

1. Peter G. Northouse, Leadership, 2010, Sage. Publication.
2. Richard L. Daft “Leadership” Cengage Learning 2005.

References

1 Uday Kumar Haldar “Leadership and Team Building” Oxford Higher Education 2010

2. Richard L Hughes, Robert C Ginnett, Gordon J Curphy “Leadrship” Tata Mc Graw Hill Education Private Limited 2012.

3. Peter Lornge, Thought leadership Meets Business, 1st edition, 2009, Cambridge.

4. John ADAIR, Inspiring Leadership, 2008, Viva Books

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18MB4T11 CHANGE MANAGEMENT

COURSE OBJECTIVES

To introduce students with various behavioral intricacies in managing change and help to identify the obstacles to change including resistance and negative reactions to change.

COURSE OUTCOMES

1 To provide in depth understanding of behavioral interventions.
2 Enable and to apply these intervention for building individual, team, systems and process related competencies.
3 To help students to understand how organizations strive to bring optimum performance and become self sustaining.

COURSE CONTENT

UNIT I INTRODUCTION

Meaning, nature and Types of Change – Importance of change, change programmes –change levers – change as transformation – change as turnaround – Identifying essential areas of change, Leading change, value based change.

UNIT II MAPPING CHANGE

The role of diagramming in system investigation – A review of basic flow diagramming techniques – systems relationships – systems diagramming and mapping, influence charts, multiple cause diagrams- a multidisciplinary approach -Systems approach to change: systems autonomy and behavior – the intervention strategy model – total project management model (TPMM). Learning organization: The relevance of a learning organization - strategies to
build a learning organization.

UNIT III ORGANIZATION DEVELOPMENT (OD)

Meaning, Nature and scope of OD - Dynamics of planned change – Person-focused and role-focused OD interventions –Planning OD Strategy – OD interventions in Indian Organizations – Challenges to OD Practioners.

UNIT IV NEGOTIATED CHANGE

Change in the labour - management relations in the post-liberalized India –collective bargaining strategy to the challenges of Globalization and the restructuring of enterprises in India - Changes in the legal frame work of collective bargaining – Negotiated flexibility, productivity bargaining, improved work relations, public sector bargaining and social security.

UNIT V OBSTACLES TO CHANGE

Resistance to change, Understanding negative reactions, easing the tension, Complacency, Identifying causes of complacency, Crisis, Reacting to a crisis, Preparing for a crisis. Adapting to change: Truths and misconceptions, Identifying truths and misconceptions, Understanding the transition process, Factors affecting response, Understanding response styles, The endings phase, Understanding the endings phase, Managing the endings phase

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Cummings: “Theory of Organisation Development and Change”, Cengage Learning, New Delhi, 2013.
2. Robert A Paton: Change Management, Sage Publications, New Delhi, 2011.

REFERENCES

1. NilanjanSengupta: Managing Changing Organisations, PHI Learning, New Delhi, 2009
2. Adrian Thornhill: Managing Change, Pearson Education, New Delhi, 2012.
3. Radha R Sharma: Change Management, TMH, New Delhi, 2012
4. Ramnarayan S., T.V. Rao and Kuldeep Singh, Organisation Development Interventions and Strategies, response Books, New Delhi.

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18MB4T12 TRAINING & DEVELOPMENT

COURSE OBJECTIVES

The course is designed to improve and understand the need of learning, methods of learning, importance of teaching techniques, instruction technology, instructor behavior, attention versus involvement. This course also enlightens the learners about psychometrics and their administration to analyze the personality of human resource.

COURSE OUTCOMES

1 Understanding factors of Job analysis and its techniques.
2 Planning, designing and evaluation of training.
3 Understanding about contemporary training methods.
4Understanding about the history of psychometrics and their application.
5 Demonstrate the ability to administer various psychometric tests.

COURSE CONTENT

UNIT I TRAINING & DEVELOPMENT

Concept, Job analysis, job evaluation – methods and techniques – manpower planning – at the start of the business and as ongoing process – performance appraisal – standards, methods, errors, differences between training and development.

UNIT – II DEVELOPMENT PROCESS

Training Need Identification, Design, Implementation, Evaluation and Development. Role of Development officers – administrators, consultants, designers and instructors, Management development program – Career development program – counseling, evaluation of programs.

UNIT – III METHODS OF TRAINING

On the job training – Off the job training – Choosing optimum method – the lecture – field trips – panel discussion – behavior modeling – interactive demonstrations – brain storming – case studies – action mazes, incident process, in-baskets, team tasks, buzz-groups and syndicates, agenda setting, role-plays-

reverse role plays, rotational role plays, finding metaphors, simulations, business games, clinics, critical incidents, fishbowls, T-groups, data gathering, grouping methods, transactional analysis, exception analysis, e-Learning.

UNIT IV PSYCHOMETRICS

Principles of Psychology, Evolution of scientific methods in Psychology, Psychometrics-meaning, definitions, need of testing, importance of Psychometrics and Psychological measurement. Social, Ethical and Legal Issues in Testing, Basic Concepts in Measurement,
Ethical Principles of Psychologists, Code of Conduct.

UNIT V PERSONALITY AND PROJECTIVE TESTS

Designing, administration and analysis of Test- PSI test, 16 PF Test, TAT cards, RST, Rorschach Inkblot Test. Psychometrics Quality**:** Threats to Psychometric Quality, Response Bias and Test Bias, Advanced Psychometric Approaches: CFA and Item Response Theory, Future of Psychometrics.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1 . B.Taylor & G.Lippitt: MANAGEMENT DEVELOPMENT AND TRAINING HANDBOOK.

2. Measurement in Psychology: A Critical History of a Methodological Concept, Joel Michell

3 Vinay shil Gautam , Shobhana Gautam ‘TRAINING AND DEVELOPMENT’ ISTD Delhi

REFERENCES

1 William E.Blank, Handbook for Developing Competency Based Training Programmes, Prentice-Hall, New Jersey.

2 David A.DeCenzo & Stephen P.Robbins: Fundamentals of Human Resource Management.

4 Psychometrics: An Introduction, Dr. R Michael Furr

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18MB4L13 DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVE

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

COURSE OUTCOMES

At the end of the course, a student will be able to

1. Design Entity Relationship models.
2. Distinguish procedural and non-procedural query languages.
3. Design database schema using normalization.
4. Explain lock-based, time stamping and tree-based protocols.
5. Illustrate Database Recovery methods.

COURSE CONTENT

UNIT-I

History of Data base Systems. Data base System Applications, data base System vs file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL, DML — Transaction Management – data base System Structure – Storage Manager – the Query Processor.

Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT-II

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data– Logical data base Design – Introduction to Views – Destroying / altering Tables and Views. Relational Algebra – Selection and projection set operations

– renaming – Joins – Division – Relational calculus –Tuple relational Calculus– Domain relational calculus

UNIT-III

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF– Schema refinement in Data base Design – Multi valued Dependencies FOURTH Normal Form.

UNIT-IV

Transaction Concept- Simple Transaction Model-Storage Structure- Transaction State- Implementation of Atomicity and Durability, Isolation– Concurrent – Executions – Serializability- Recoverability Implementation of Isolation-Transactions as SQL Statements.

Concurrency Control: Lock – Based Protocols-Dead lock Handling– Timestamp Based Protocols-Validation- Based Protocols-Multi version schemes-insert, delete and predicate operations– Multiple Granularity.

UNIT-V

Recovery System: Recovery and Atomicity – Log – Based Recovery– Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- ARIES Data on External Storage – overview of physical storage media- RAID-File Organization and Indexing-Data Dictionary Storage– Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing —B+ Trees: A Dynamic Index Structure.

TEXT BOOKS

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.
2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.
3. C.J.Date, "*Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

REFERENCES

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7th Edition, Pearson Education, 2000.
2. Elmasri Navrate, *"Fundamentals of Database Systems"*, 5th Edition, Pearson Education, 2007.

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18MB4L14 MARKETING ANALYTICS

COURSE OBJECTIVE

To enable students to understand and interpret the marketing data for better business decisions.

COURSE OUTCOMES

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

1. Understand and analyze customer data.
2. Analyze and interpret marketing data through various methodologies.
3. Make data-driven managerial decisions.
4. Communicate research findings in the language of decision makers

COURSE CONTENT

UNIT I

Introduction to Analytics: Marketing Analytics as an enabler of Marketing Strategy - Statistical Foundations of Marketing - Descriptive Statistics - Distributions - General Linear Models – Optimization.

UNIT II

Pricing and Revenue Management: Point-of-sale Data - Deciding on the "Right" Pricing Approach/Strategic Pricing - Implementing tools to support pricing strategy - Managing the prices to meet revenue goals/Tactical Pricing Session,

UNIT III

Assortment Optimization: Panel and Point-of-Sale data - Customer meets product - A retailer's nightmare: shelf-space optimization - Site-to-store - Product meets customer. Customer Lifetime Value:

UNIT IV

Customer Lifetime Value : Loyalty Data - What is a customer's lifetime? - How can we predict it? Market Basket Analysis: Market Basket Data - Product Affinities

UNIT V

Web Analytics : Online Data - Managing the online real estate - The "cloud". Marketing Budget Optimization Across Channels - Search Engine Marketing versus Search Engine Optimization - Managing the Delivery of Analytics Projects - Client is always right Session - Future of Marketing Analytics

TEXT BOOK

Data-Driven Marketing: The 15 Metrics Everyone in Marketing Should Know, Author Mark Jeffery, ISBN 0470504544.

REFERENCE

Data Mining for the Masses, Author Dr. Matthew A. North, ISBN 0615684378

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18MB4L15 DATA WAREHOUSING AND DATA MINING

COURSE OBJECTIVE

This course will introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data ware housing concepts.

COURSE OUTCOMES

1. Understand Data Warehouse fundamentals, Data Mining Principles
2. Design data warehouse with dimensional modeling and apply OLAP operations.
3. Identify appropriate data mining algorithms to solve real world problems
4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining.

COURSE CONTENT

UNIT – I

Warehouse: What is it, Who Need It, and Why?, Things to Consider, Managing the Data Warehouse, Data Warehouse Design Methodology, Data Marts and Star Schema Design, Fundamentals of ETL Architecture, Partitioning Data, Indexing Data.

UNIT – II

Data Mining: Introduction, Data mining on What Kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

Data Preprocessing: Why Preprocess the Data? Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization.

UNIT – III

Classification and Prediction: Introduction, Classification by Decision Tree Induction,

Bayesian Classification. Other Classification Methods, Classification by Back Propagation, Prediction, Classifier Accuracy.

UNIT – IV

Association Analysis: Mining Association Rules in large databases - Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multi- Dimensional Association Rules from Relational Databases and Data Warehouses.

UNIT – V

Cluster Analysis – Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods: DBSCAN, Grid- Based method: STING, Model Based Clustering Method: Statistical Approach, Outlier Analysis.

TEXT BOOKS

1) Michael Corey, Michael Abbey, Ian Abramson, Ben Taub, "Oracle 8i Data Warehousing", TMH (Unit-I)
2) Jiawei Han Micheline Kamber, "Data mining & Techniques", Morgan Kaufmann Publishers (Units-II-V)

REFERENCE

1) S.N.Sivanandam, S.Sumathi, "Data Mining – Concepts, Tasks and Techniques", Thomson (2006).
2) Ralph Kimball, "The Data Warehousing Toolkit", Wiley.

MBA IV SEMESTER

L	T	P	C
4	1	0	3

18MB4T16 CORPORATE ENTREPRENEURSHIP

COURSE OBJECTIVES

This course develops a basic knowledge of what is corporate entrepreneurship and how entrepreneurship works within a corporation is similar to or differed from start-up entrepreneurship. It also helps to assess the degree to which the environment within an established company supports or constrains entrepreneurship. There is also a gain of appreciation to formulate corporate objectives and strategies that support entrepreneurial behavior.

COURSE OUTCOMES

1. To understand the importance, role and various obstacles in Corporate Entrepreneurship.
2. The main aim of Corporate Entrepreneurship to achieve the Venture through different Business Plans and Funding on it.
3. To understand & manage the Entrepreneurial Process.
4. To manage Corporate Venture capital investment in the Entrepreneurship.
5. To be able to facilitate & control the Corporate Entrepreneurship.

COURSE CONTENT

UNIT-I

Introduction: Understanding Corporate Entrepreneurship: Nature, meaning, definition and Importance of Corporate Entrepreneurship – Obstacles in the Corporate Environment – How Innovation Actually Happens – Crucial roles of Innovation – Entrepreneurial Orientation (EO) – Entrepreneurial Intensity – Forms of Corporate Entrepreneurship – Levels of Corporate Entrepreneurship – HR in the Entrepreneurial Organization – Human Resource Capabilities.

UNIT-II

Organizing the Venture: Diagnosing organization for Climate for Innovation –The Internal Policies of Venturing – Developing Intrapreneurial Business Plan – Building an Organizational Environment Conducive to Entrepreneurial Endeavors: Resources, Process and Priorities – Selecting, Evaluating, and Compensating Corporate Entrepreneurs – Funding the Venture.

UNIT-III

Corporate Strategy and Entrepreneurship: Behavioral Aspects of Corporate Entrepreneurship – Role of the Intrapreneur – How to Succeed As an Intrapreneur – Entrepreneurial Structure and Culture in Organization – Identifying, Evaluating & Selecting Opportunity – Corporate Entrepreneurship In the Social Sector – Understanding & Managing the Entrepreneurial Process – Locating the Venture in the Organization.

UNIT-IV

Implementing Corporate Venturing in Organization – Constraints on Entrepreneurial Performance & Leading the Entrepreneurial Organization – Intrapreneuring within a Structured Development Process – Managing Corporate Venture Capital Investments – Corporate Entrepreneurship via Acquisition, Investment and Partnership Managing Corporate Venture Capital Investments

UNIT-V

Assessing & Controlling of Corporate Entrepreneurship: Facilitators of Entrepreneurial Performance – Improving Climate for Innovation – Managing and Sustaining Entrepreneurial Performance in the 21st Century – The Future of the Intrapreneurial Organization –Corporate Entrepreneurship in Developing Economies.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Donald F. Kuratko, Michael H. Morris, Jeffrey G. Covin, 'Corporate Innovation & Entrepreneurship, International Edition 3e, Cengage Learning, 2011.
2. Michael H. Morris, Donald F. Kuratko, Jeffrey G Covin, Corporate Entrepreneurship & Innovation', Cengage Learning, 2010.

REFERENCE

1.Donald F. Kuratko, Corporate Entrepreneurship, Now Publishers Inc, 2007

2. Michael H. Morris, Donald F. Kuratko, 'Corporate Entrepreneurship: Entrepreneurial Development within Organizations', Harcourt College Publishers, 2002.

3 . Paul Burns, 'Corporate Entrepreneurship: Entrepreneurship and Innovation in Large Organizations', Kindle Book

4. Tom Elfring, 'Corporate Entrepreneurship and Venturing', Springer Science & Business Media, 2005.

L	T	P	C
4	1	0	3

MBA IV SEMESTER

18MB4T17 STARTUP & NEW VENTURE MANAGEMENT

COURSE OBJECTIVES

To encourage the spirit of entrepreneurship among the student participants, by providing an overview of the competences needed to become an entrepreneur. It also gives insights about the Management of Small Family Business to start. It also focuses on the legal issues that are too aware before running into troubles.

COURSE OUTCOMES

1. To learn about factors affecting Startup and New Venture.
2. To know about the Market Research for Entrepreneurship.
3. To be aware about Estimating Capital Cost of Project.
4. To understand about the Changes in Management Style and Organization Design.
5. To know about the Handing over to family Member the venture.

COURSE CONTENT

UNIT-I

Introduction: A Typology of Entrepreneurs — Entrepreneur & Entrepreneurship — Entrepreneurial Competencies — Factor Affecting Startup and New Venture — Innovation and Entrepreneurship – Reward, Challenges and Myths of Entrepreneurship - Entrepreneur and Corporate Manager – Entrepreneurship and Economic Growth – New Venture Management: Significance, Challenges and Options —Venture Management versus Corporate Management —Five Critical Success Factors for New Ventures.

UNIT-II

Identifying and Evaluating Opportunities – The Entrepreneurial Process – Opportunity Identification – Market Research for Entrepreneurship – Evaluating Opportunities — The Business Plan – The concept and Business Plan – The need for Business Plan – Contents of a Business plan – Making the Business plan – Presenting the Business plan .

UNIT–III

Starting Up – Legal Issues: The Legal Environment – Forms of Startup Organization – Approval for New Venture – Taxes or Duties Payable – Intellectual Property – Franchising Starting Up – Financial Issues: Types of Finance – Estimating Capital Cost of Project – Securing Finance – Sources of Finance – What lenders and investors look for.

UNIT–IV

Starting Up – Human Angle: Individual or Team Start-up – Acquiring Influence by Networking – Leadership – Designing the organization – organization culture. Venture Survival and Growth: Venture Life patterns – Start-up Phase – Early Growth – Changes in Management Style and Organization Design – New venture failures.

UNIT-V

Harvesting: Venture Harvesting/Exit Strategies – Handing over to family Member – Selling the Business – Going Public (IPO) – Liquidation.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ram Chandran, 'Entrepreneurial Development', Tata McGraw Hill, New Delhi

2. Saini, J. S., 'Entrepreneurial Development Programmes and Practices' , Deep & Deep Publications (P), Ltd.

REFERENCE

1. Khanka, S S. 'Entrepreneurial Development', S Chand & Company Ltd. New Delhi

2. Badhai, B 'Entrepreneurship for Engineers', Dhanpat Rai & co. (p) Ltd.

3. Desai, Vasant, 'Project Management and Entrepreneurship', Himalayan Publishing House, Mumbai, 2002.

4. Gupta and Srinivasan, 'Entrepreneurial Development', S Chand & Sons, New Delhi.

MBA IV SEMESTER

L	T	P	C
4	1	0	3

18MB4T18 SOCIAL ENTERPRISE MANAGEMENT

COURSE OBJECTIVES

This course is conceived and designed to enable student-participants become aware of, develop sensitivity towards and internalize the larger global context and concerns that have all warranted the birth, rise, health and sustenance of Social Entrepreneurship and Enterprises.

COURSE OUTCOMES

1. To critically evaluate on History and Evolution of Social Entrepreneurship.
2. To use of Market Research Tools under Society based innovations.
3. To make aware about the usage of the finances to manage Social enterprise.
4. To create a Successful Business Model and Funding.

COURSE CONTENT

UNIT-I

Introduction: The Need for and Concept of MDGs and SDGs – Global Development Organizations – Examples and Descriptions – Social Enterprises (SEs) and Entrepreneurship – An Overview: Basic Definitions and Concepts; Morphology of SEs – History and Evolution of Social Entrepreneurship – Social Entrepreneurship and Enterprises – Past and Emerging Trends;
Anticipating the Future – International and National Examples of Pioneers – Hybrid Spectrum of SEs – Business Models, Legal and Organizational Manifestations – Types and Functions of SEs such as Fair Trade Organizations, Cooperative Organizations, etc. – SEs in Different Sectors

UNIT-II

SEs' Conception, Design and Incubation: Social Entrepreneurial Initiatives – Opportunity Analysis and Idea Generation Tolls and Approaches – The Use of Market Research Tools – Design Thinking for SEs and Innovations in their Lifecycles – Issues in the Early Stages of SEs' lifecycles – Organizational Launch and Development Processes in Social Entrepreneurship.

UNIT-III

Management of SEs – Functions and Issues; Management – Purpose, Concepts, Functions and Resources – Types and Sources of Finance – Resource Mobilization Strategies – Core Issues in Management – Value, Risk, Returns and Cost.

UNIT-IV

BOP Markets: Definition, Examples, the Impact of Culture – the Poor as Consumers, Business Models at the BOP – Designing Products that will Create Value for the BOP – Providing Access to Credit – Providing Access to Information and Financial Services through technology– Providing Access to Health Care, Education

UNIT-V

Newer Business Models at the BOP: Social Entrepreneurs, Challenges for Social Entrepreneurs– Creating a Successful Business Model and Funding, Generating Income, Scaling and Replicating to Increase Impact, social Entrepreneur's Point of View, New Opportunities for Collaborative Ventures at the BOP – Evaluating the Social Impact of BOP Ventures.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Beverly Schwartz, Rippling: How Social Entrepreneurs Spread Innovation Throughout the World, Jossey-Bass, 2012
2. David Bornstein, How to Change the World: Social Entrepreneurs and the Power of New Ideas, Oxford University Press, 2004.

3. Arthur C. Brooks, Social Entrepreneurship: A Modern Approach to Social Value Creation, 1st edition,

REFERENCE

1. David Bornstein, Social Entrepreneurship: What Everyone Needs to Know, Oxford University Press, 2010.
2. John Elkington, Pamela Hartigan, The Power of Unreasonable People: How Social Entrepreneurs Create Markets That Change the World, Harvard Business Review Press, 2008.
3. James C. Collins, Good to Great and the Social Sectors: A Monograph to Accompany Good to Great, HarperBusiness, 2001.

DEPARTMENT OF COMPUTER APPLICATIONS
Course Structure (Autonomous) for MCA.
MCA I Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18MC1T01	ESC	Introduction to Computer and C Programming	3			3	3
2	18MC1T02	PCC	Computer Organization	3			3	3
3	18MC1T03	PCC	Discrete Mathematical Structures and Graph Theory	3			3	3
4	18MC1T04	HSMC	Accountancy & Financial Management	3			3	3
5	18MC1T05	BSC	Probability & Statistics	3			3	3
6	18MC1L06	HSMC	English Communication Skills Lab			4	2	2
7	18MC1L07	ESC	C Programming Lab			4	2	2
8	18MC1T08	MC	Environmental Studies	2			2	--
Total credits								19

MCA II Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18MC2T01	PCC	Data Structures	3			3	3
2	18MC2T02	PCC	Operating Systems	3			3	3
3	18MC2T03	PCC	Data Base Management Systems	3			3	3
4	18MC2T04	HSMC	Management Science	3			3	3
5	18MC2T05	PCC	Unix Shell Programming	3			3	3
6	18MC2L06	PCC	Data Structures through C Lab			4	2	2
7	18MC2L07	PCC	DBMS Lab			4	2	2
8	18MC2L08	PCC	Unix Shell Programming Lab			4	2	2
Total credits								21

MCA III Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18MC3T01	PCC	Java Programming	3			3	3
2	18MC3T02	ESC	R Programming	3			3	3
3	18MC3T03	PCC	Software Engineering	3			3	3
4	18MC3T04	PCC	Computer Networks	3			3	3
5	18MC3T05	PCC	Design & Analysis of algorithms	3			3	3
6	18MC3L06	PCC	Java Programming Lab			4	2	2
7	18MC3L07	ESC	R Programming Lab			4	2	2
8	18MC3T08	HSMC	Professional Ethics & Human Values	2			2	--
Total credits								19

MCA IV Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18MC4T01	PCC	Web Technologies	3			3	3
2	18MC4T02	PCC	Python Programming	3			3	3
3	18MC4T03	PCC	Data warehousing & Data Mining	3			3	3
4	18MC4T04	PCC	E-Commerce	3			3	3
5	18MC4T05/ 18MC4T06/ 18MC4T07	PEC	Elective 1: Cryptography & Network Security / Distributed Systems / Artificial Intelligence	3			3	3
6	18MC4L08	PCC	Web Technologies Lab			4	2	2
7	18MC4L09	PCC	Python Programming Lab			4	2	2
8	18MC4L10	PCC	Object Oriented Analysis & Design Lab			4	2	2
9	18MC4T11	HSMC	Employability Skills	3			3	--
Total credits								21

MCA V Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18MC5T01	PCC	Software Testing Methodologies	3			3	3
2	18MC5T02	PCC	Hadoop & Big Data	3			3	3
3	18MC5T03	PCC	Mobile Computing	3			3	3
4	18MC5T04/ 18MC5T05/ 18MC5T06	PEC	**Elective 2:** Machine learning &Deep Learning Cloud computing Human Computer Interaction	3			3	3
5	18MC5T07/ 18MC5T08/ 18MC5T09	PEC	**Elective 3:** Internet of Things Software Project Management Data Analytics	3			3	3
6	18MC5L10	PCC	Hadoop & Big Data Lab			4	2	2
7	18MC5L11	PCC	Mobile Application Development Lab			4	2	2
8	18MC5T12	PROJ	Project – I			4	2	2
								21

MCA VI Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18MC6T01	T	Technical Seminar		3		3	3
2	18MC6L02	PROJ	Project – II			32	16	16
								19

SEMESTER I

SYLLABUS

Introduction to Computer and C Programming

Scheme and Credits: L:3 T:0 P:0 C:3

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
- To use structures and files

UNIT – I:

Introduction to Computer Problem Solving: Programs and Algorithms, characteristics of an algorithm, Flowchart, Pseudo-code, The Problem – Solving Aspect, Top-Down design
Fundamental Algorithms Introduction, Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, reversing the digits of an Integer.

UNIT – II:

Factoring Methods: Introduction, GCD of two Integers, Generating Prime numbers, Computing the Prime Factors of an Integer, Generation of pseudo-random numbers

Array Techniques: Introduction, Array Order Reversal, Finding the Maximum number in a set, Removal of duplicates from an ordered array, Partitioning an Array

UNIT-III:

Programming Languages and Introduction to C Programming: Properties of Machine Language, Assembly Language, High-Level Languages, Procedural and Object-Oriented Languages. Structure of C program, Indentation, Comments, Identifiers& variables, Data Types Interactive Input, Formatted Output, Format Modifiers, Operators, Operator precedence & Associativity, Relational expressions, Type Casting, Mathematical Library Functions, Selection control statements: if and switch

UNIT -IV:

Repetition structures: Basic Loop Structures: while, for , do-while, Nested loops, **Modular Programming:** Functions and parameter declarations, Returning a Value,Functions with Empty Parameter Lists, Variable Scope

Modular Programming Variable Storage Class: Local, Global, **Pointers:** declaration and its usage, Functions with parameters: pass by value, pass by address, pointer to a function and function pointer

UNIT-V:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization,

Arrays as Function Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices
Strings: String Fundamentals, String Input and Output, String Processing, Library Functions related to strings.

TEXT BOOKS:

[1] R.G. Dromey, "How to Solve it By Computer", Prentice-Hall International Series in Computer Science,1982.

[2] Reema Thareja, "Computer Fundamentals and C Programming", Oxford, 2012

REFERENCE BOOKS:

[1] DENNIS M. RITCHIE, BRIAN W KERNIGHAN, "The C Programming Language", Prentice-Hall International Series in Computer Science, Second Edition.

[2] Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction to Programming and Problem Solving With Pascal", John Wiley and Sons Inc ,1984.

[3] David Gries, "The Science of Programming", Springer Verlag,1981.

COMPUTER ORGANIZATION

Scheme and Credits: L:3 T:0 P:0 C:3
PREREQUISITES: -DLD

COURSE OUTCOMES:

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

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input – Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

Discrete Mathematical Structures and Graph Theory

Scheme and Credits: L:3 T:0 P:0 C:3

SYLLABUS:

UNIT-I

Mathematical Logic: Introduction, Statements and Notation, Connectives, Normal forms, Theory of inference for Statement Calculus, The Predicate Calculus, Inference theory of Predicate calculus.

UNIT-II

Set Theory: Introduction, Basic concepts of set theory, Principle of Inclusion and Exclusion, Properties of Binary relations, Relation matrix and Digraph, operations on relations, Partition and covering, Transitive closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, Bijective functions, Inverse functions, Composition of functions, Recursive functions, Pigeonhole principle and its applications.

UNIT-III

Algebraic Structures: Algebraic systems and examples, general properties, semigroup, monoid, groups and subgroups.

Number Theory: Properties of integers, Division algorithm, The greatest common divisor, Euclidean algorithm (without proof), Least common multiple, testing of prime numbers, The fundamental theorem of Arithmetic, Fermat's theorem and Euler's theorem (without proofs) and its applications.

UNIT-IV

Combinatorics and Recurrence Relations: Basic counting principles- sum rule, solving recurrence relations by substitution and by the method of characteristic roots.

UNIT -V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems withoutProofs).

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblayand P. Manohar, Tata McGraw Hill
3. Mathematical Foundation for Computer science, S. Santha, E.V. Prasad, Cengage publications.

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REFERENCE BOOKS:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H.Rosen, 7th Edition, Tata McGraw Hill.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI. 3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

Accountancy & Financial Management

Scheme and Credits: L:3 T:0 P:0 C:3

COURSE OBJECTIVES:
The main objectives of this course are given below:

- The Learning objective of this Unit is to understand the concept and nature of Managerial Economic s and its relationship with other disciplines, Concept of Demand and Demand forecasting
- The Learning objective of this Unit is to understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost-Volume-Profit Analysis
- The Learning Objective of this Unit is t understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods.
- The Learning objective of this Unit is to know the different forms of Business organization and their Merits and Demerits both public & private Enterprises and the concepts of Business Cycles
- The Learning objective of this Unit is to understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation
- The Learning objective of this Unit is to understand the concept of Capital, Capitalization, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods.

COURSE OUTCOMES:
At the end of this course the student will able to:

- The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand.
- One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs.
- One has to understand the nature of different markets and Price Output determination under various market conditions.
- One should equipped with the knowledge of different Business Units
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

Syllabus

UNIT – I:
Introduction to Managerial Economics and demand Analysis:
Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Demand forecasting and its Methods.

UNIT – II:
Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions- Cobb-Douglas Production function-Economics of Sale-Cost Concepts- Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis- Determination of Break-Even Point (Simple Problem).

UNIT – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements- Analysis and Interpretation of Financial Statements

Capital Budgeting: Meaning of Capital Budgeting-Need for Capital Budgeting- Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS :

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES :

1. V. Maheswari : Managerial Economics, Sultan Chand.
2. Suma Damodaran : Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. VanithaAgarwal : Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja : Financial Accounting for Managers, Pearson.
6. Maheswari : Financial Accounting, Vikas Publications.
7. S. A. Siddiqui & A. S. Siddiqui : Managerial Economics and Financial Analysis, New Age International Publishers, 2012.

PROBABILITY AND STATISTICS

Scheme and Credits: L:3 T:0 P:0 C:3

SYLLABUS:

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function-Expectation-Moment Generating function-Moments and properties. Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties. Continuous distribution: Normal distributions, Normal approximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Centrallimit theorem- t-distribution- Sampling distribution of means (s unknown)- Sampling distribution of variances -χ^2 and F-distributions- Point estimation- Maximum error ofestimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means-Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares-Goodness of fit. Correlation and Regression – Properties.

Text Books:

1. **Richards A Johnson, Irvin Miller and Johnson E Freund**. Probability and Statistics for Engineering, 9th Edition, PHI.
2. **Jay l.devore,** Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

1. **Shron L. Myers, Keying Ye, Ronald E Walpole,** Probability and Statistics Engineers and the Scientists,8th Edition, Pearson 2007.
2. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction toprobability and statistics, Cengage learning, 2009.

ENGLISH COMMUNICATION SKILLS LAB

L	T	P	C
0	0	4	2

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1 **Greetings and Introduction**

2 **Request Permission & Giving Directions**

3 **Inviting/Complaining/Congratulating**

4 **Root Words**

5 **Phonetics-Sounds and Symbols**

6 **Pronunciation Rules**

References:

1. ***Strengthen Your Steps,*** Maruti Publications

2. ***Interact,*** Orient Blackswan

3. Word Power Made Easy, Pocket Books

L	T	P	C
0	0	4	2

C PROGRAMMING LAB

List of Experiments

1. a. Write an algorithm, flowchart and pseudo code to perform all arithmetic operations
   b. Write an algorithm, flowchart and pseudo code to find average of three numbers
   c. Write an algorithm, flowchart and pseudo code to find smallest of three numbers
2. a. Write an algorithm, flowchart and pseudo code for finding smallest divisor of an integer.
   b. Write an algorithm, flowchart and pseudo code to find x^y
3. Write a C program to convert temperature from Fahrenheit to Celsius and vice versa.
4. Write a C program to find the roots of quadratic equation
5. Write a C program to find whether a given number is prime
6. Write a C program find whether a given number is armstrong
7. Write a C program to display reverse of a given number
8. Write a C program to generate first n- terms of a Fibonacci sequence.
9. Write a C program to calculate sin(x) value, where x is input given by user
10. Write a C program to calculate cos(x) value, where x is input given by user
11. Write a C program to perform operations on one dimensional array
    a. Smallest element of an array
    b. Largest element of an array
    c. swap smallest and largest element in an array
12. Write a C program to implement the following
    a. Addition of two matrices
    b. Multiplication of two matrices
13. Write a C program to perform the following operations on strings without using string handling functions
    a. To display length of the string
    b. To check whether a string is palindrome
    c. To delete n characters from a given position in a given string
14. Write recursive and non recursive programs for the following
    a. Factorial of a number
    b. GCD of two numbers
    c. Fibonacci series
15. Write a program which illustrates Storage classes

ENVIRONMENTAL STUDIES

COURSE OUTCOMES:

1. The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
2. The concepts of the ecosystem and its function in the environment.
3. The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
4. The various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices.
5. The environmental legislations of India and Social issues and the possible means
6. Environmental assessment and the stages involved in EIA.

SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of Environmental Studies- Importance of Environmental Studies- Need for public awareness, Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference, Earth summit

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grass land eco system ,Desert ecosystem- Aquatic ecosystem: pond ,lake ecosystem- Streams ,river ecosystem, Oceans

UNIT-II : NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources-Forest resources**:** Use and over-exploitation - Deforestation-Timber extraction-Mining- Conservation-Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management-Energy resources**:** renewable energy sources –solar-wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels-Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: BIODIVERSITY AND ITS CONSERVATION

Definition, classification- Value of biodiversity-Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India-Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV:ENVIRONMENTAL PROBLEMS

Global warming, Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects, control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTALLEGISLATION&MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of Envirronmental Management Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

II SEMESTER

SYLLABUS

Data Structures

Prerequisites: C PROGRAMMING

SYLLABUS:

UNIT - I:

Sortings: Bubble sort, Insertion sort, section sort

Searching: linear search, binary search

UNIT II:

Pointers: Introduction, Pointer Arithmetic and Arrays, Memory Allocations Functions ,Compatibility, Lvalue and Rvalue, Arrays and Pointers, Passing an Array to a Function, , Array of Pointers. Pointers For Inter Function Communications, Pointers to Pointers

UNIT III:

Structures: Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

Unions: Referencing Unions, Initializers, Unions and Structures, Applications.

Text Input/output: Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

UNIT IV:

Stacks: Definition, Representing stacks, ADT Stack and its operations: Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms. Recursion, Towers of Hanoi problem.

Queues: Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

UNIT V:

Linked lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; **Doubly linked list:** operations and algorithms.

Circular Linked Lists: all operations their algorithms, Linked representation of Stack and Queue. Polynomials: Addition, Multiplication.

TEXT BOOKS:

[1] ReemaThareja, “Computer Fundamentals and C Programming”, Oxford, 2012

[2] Mark Allen Weiss,”Data structure and Algorithm Analysis in C”. Addison Wesley Publication.2006.

[3] SEYMOUR LIPSCHUTZ, “Data Structures With C – by Schaum Series”.

REFERENCE BOOKS:

[1] Horowitz Sahni and Anderson-Freed “Fundamentals of Data Structures in C”. 2nd Edition, Universities Press,2008.

[2] Richard F. Gilberg& B. A. Forouzan “Data Structures A Pseudocode Approcah with C”, Second Edition, CENGAGELearning.

OPERATING SYSTEMS

COURSE OUTCOMES:

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

1. Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.
2. Apply synchronization to cooperating processes and handle the deadlocks
3. Learn various management techniques for efficient utilization of system memory.
4. Understand and analyze theory and implementation of files and Evaluate different disk scheduling algorithms.
5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

DATA BASE MANAGEMENT SYSTEMS

COURSE OUTCOMES:

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

1. Describe a database and different database models
2. Design Entity Relationship models And Relational Model
3. Design and implement queries using Structured Query Language
4. Design database schema using normalization.
5. Understand the characteristics of database transaction management.

SYLLABUS:

Unit – I:

Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, and Database applications.

Brief introduction of different Data Models- the ER Model – Relational Model – Other Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure.

Unit – II:

Entity Relationship Model: Introduction, Representation Of Entities, Attributes, Entity Set, Relationship, Relationship Set, Constraints, Sub Classes, Super Class, Inheritance, Specialization, And Generalization Using ER Diagrams.

Relational Model: Introduction to Relational Model, Concepts of Domain, Attribute, Tuple, Relation, Importance Of Null Values, Constraints (Domain, Key Constraints, Integrity Constraints) And Their Importance

Unit – III:

SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion), Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering.

Implementation of different types of joins, view(updatable and non-updatable), relational set operations, Definition of NOSQL, History of NOSQL and Different NOSQL products, Applications, features of NoSQL, Difference between SQL and NoSQL

Unit-IV

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF),

concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Indexing: Hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

Unit-V

Transaction Management And Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint, Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods: lock granularity, lock types, two-phase locking for ensuring serializability, deadlocks.

Recovery System: Introduction to ARIE, The Log, The Write-Ahead Log Protocol, check pointing, Recovery from system crash

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.

2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.

3. C.J.Date, "*Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

4. Professional NOSQL" by Shashank Tiwari, 2011, WROX Press.

REFERENCES:

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7th Edition, Pearson Education, 2000.

2. ElmasriNavrate, *"Fundamentals of Database Systems"*, 5th Edition, Pearson Education, 2007.

UNIX SHELL PROGRAMMING

OBJECTIVES:

- Written technical communication and effective use of concepts and terminology.
- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Individual capability in problem solving using the tools presented within the class.
- Students will demonstrate a mastery of the course materials and concepts within in class discussions.

SYLLABUS

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

TEXT BOOKS:

1. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.
2. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.

REFERENCE BOOKS:

1. Unix and shell programmingby B.M. Harwani, OXFORD university press.

Data Structures Lab

List of Experiments

1. Write C programs to sort the list of elements using following techniques
a. Bubble Sort b. Insertion Sort c. Selection Sort
2. Write C programs to search for an element in an array using following techniques
a. Linear Search b. Binary Search
3. Write a C program to demonstrate call by value and call by reference
4. Write a C program to display student information using structures
5. Write a C program to count number of lines, words and characters in a file
6. Write a C program to perform stack operations using arrays
7. Write a C program to perform queue operations using arrays
8. Write C program to implement stack applications.
a. Conversion of Infix expression to postfix expression b. Evaluation of postfix expression c. Towers of Hanoi
9. Write a C program to perform circular queue operations using arrays
10. Write a C program to implement following operations on Single Linked List
a. Insertion b. Deletion c. Search
11. Write a C program to implement following operations on Double Linked List
a. Insertion b. Deletion c. Search
12. Write a C program to implement stack operations using linked list
13. Write a C program to implement queue operations using linked list
14. Write a C program to add two polynomials using linked list
15. Write a C program to multiply two polynomials using linked list

DATA BASE MANAGEMENT SYSTEMS LAB

COURSE OUTCOMES:

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

1. Create own database.
2. Manipulate data in database using SQL language.
3. Experiment with various SQL queries with database created
4. Write programs using PL/SQL language.
5. Create triggers using PL/SQL.

LIST OF LAB EXPERIMENTS:

1. Introduction to SQL: DDL, DML, DCL, TCL.
2. Queries for Creating Tables with Constraints, Views.
3. Example SQL Queries using select.
4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN).
5. Queries using Group By, Order By, and Having Clauses and Working with Index, Sequence, Synonym.
6. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
7. Queries on Joins and Correlated Sub-Queries.
8. Write a PL/SQL Code using Basic Variable, Anchored declarations, and Usage of Assignment Operation.
9. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL.
10. Write a PL/SQL block using SQL and Control Structures in PL/SQL.
11. Write a PL/SQL Code using Cursors, Exceptions and Triggers.
12. Write a PL/SQL Code using Procedures, Functions, and Packages.

TEXT BOOKS :

1) ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson
2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, TMH.
3) SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.
4) Data Base Management System, Oracle SQL and PL/SQL, Pranabkumar Das Gupta, P Radha Krishna, PHI.

UNIX PROGRAMMING LAB

1. a) Study of Unix/Linux general purpose utility command list
man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.
b) Study of vi editor.
c) Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
d) Study of Unix/Linux file system (tree structure).
e) Study of .bashrc, /etc/bashrc and Environment variables.
2.Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program to emulate the UNIX ls –l command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe.
Ex: - ls –l | sort
5. Write a C program that illustrates two processes communicating using sharedmemory
6. Write a C program to simulate producer and consumer problem usingsemaphores
7. Write C program to create a thread using pthreads library and let it run its function.
8. Write a C program to illustrate concurrent execution of threads using pthreads library.

SEMESTER III

SYLLABUS

JAVA PROGRAMMING

Lecture :3	**Practical : 0**	**Internal Marks:30**
Credits: 3	**Tutorial :0**	**External Marks:70**

COURSE OUTCOMES:

1. Understand the principles of object oriented concepts. Define classes and objects by identifying real world entities, their properties and functionalities.
2. Reuse the existing classes by using inheritance and understand the concepts of packages and exception handling.
3. Make use of built-in classes in Java and understand the concept of thread.
4. Develop user interfaces using applets, AWT and Event handling in java.
5. Create portable GUI applications using Swing components.

UNIT-I:

Introduction to OOP, procedural programming language vs object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector.

UNIT-II:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

Exception handling, importance of try, catch, throw, throws and finally block, userdefined exceptions, Assertions.

UNIT-III:

Multithreading: Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-IV:

Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

UNIT-V:

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List, Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

TEXT BOOKS:

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.
3. JAVA for Beginners,4e,JoyceFarrell,Ankit R. Bhavsar,Cengage Learning.
4. Object oriented programming with JAVA,Essentials and Applications, Raj Kumar Bhuyya,Selvi,Chu,TMH.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1. JavaProgramming,K.Rajkumar.Pearson
2. CoreJava,BlackBook,RNageswararao,Wiley,Dream Tech
3. Core Java for Beginners, Rashmi Kanta Das,vikas.
4. Object Oriented Programming Through java, P.Radha Krishna,Universities Press

R PROGRAMMING

18MC3T02

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits: 3	**Tutorial : 0**	**External Marks:70**

COURSE OBJECTIVES:

After taking the course, students will be able to

- Use R for statistical programming, computation, graphics, and modeling,
- Write functions and use R in an efficient way,
- Fit some basic types of statistical models
- Use R in their own research,
- Be able to expand their knowledge of R on their own.

UNIT-I: Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.
UNIT-II: R Programming Structures, Control Statements, Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quick sort Implementation Extended Extended Example: A Binary Search Tree.
UNIT-III: Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus,Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Set Operation, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files,
UNIT-IV: Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot () Function – Customizing Graphs, Saving Graphs to Files.
UNIT-V: Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,- ANOVA. Linear Models, Simple Linear Regression, -Multiple Regression.

OUTCOMES:

At the end of this course, students will be able to:

- List motivation for learning a programming language
- Access online resources for R and import new function packages into the R workspace
- Import, review, manipulate and summarize data-sets in R
- Explore data-sets to create testable hypotheses and identify appropriate statistical tests
- Perform appropriate statistical tests using R Create and edit visualizations with

TEXT BOOKS:

1) The Art of R Programming, A K Verma, Cengage Learning.

2) R for Everyone, Lander, Pearson

3) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCE BOOKS:

1) R Cookbook, Paul Teetor, Oreilly.

2) R in Action, Rob Kabacoff, Manning

SOFTWARE ENGINEEERING

18MC3T03

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits: 3	**Tutorial : 0**	**External Marks:70**

COURSEOUTCOMES

At the end of the Course Students will be able to:

CO1: Understand the software life cycle models and the importance of the software process.
CO2: Acquire skills to think about problems and their solutions using appropriate methods of analysis and design.
CO3: Understand the importance of modeling and modeling languages.
CO4: Design and develop correct and robust software products.
CO5: Understand the basics of deployment and maintenance of software development project.

UNIT I-INTRODUCTION

Software Engineering, Software Process-Generic process model-Prescriptive process model-specialized, unified process-Agile development-Agile Process-Extreme Programming-Other agile Process models-Software Engineering Knowledge-core Principles.

UNIT II-REQUIREMENTS

Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing use cases-Building the requirements model-Negotiating, validating Requirements-Requirements Analysis-Requirements Modeling Strategies.

UNIT III-DESIGN

MODELING WITH UML: Modeling Concepts and Diagrams-Use Case Diagrams-Class Diagrams-Interaction Diagrams-State chart Diagrams-Activity Diagrams-Package Diagrams-Component Diagrams–Deployment Diagrams

Design Process-Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes-Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements .

UNIT IV-SOFTWARE IMPLEMENTATION

Structured coding Techniques-Coding Styles-Standards and Guidelines-Documentation Guidelines-Modern Programming Language Features: Type checking-User defined data types-Data Abstraction-Exception Handling-Concurrency Mechanism.

UNIT V-TESTING AND MAINTENANCE

TESTING: Software Quality-Software Quality Dilemma-Achieving Software Quality-Testing: Strategic Approach to software Testing-Strategic Issues-Testing: Strategies for Conventional Software, Object oriented software, System Testing, Art of Debugging

MAINTENANCE: Software Maintenance-Software Supportability-Reengineering-Business Process Reengineering-Software Reengineering-Reverse Engineering-Restructuring-Forward Engineering-Economics of Reengineering

TEXT BOOKS

1. Roger S, “Software Engineering–A Practitioner’s Approach”, seventh edition, Pressman, 2010.
2. Pearson Edu, “Software Engineering by Ian sommerville”, 9th edition, 2010.

REFERENCES

1. Hans Van Vliet, “Software Engineering: Principles and Practices”, 2008.
2. Richard Firley, “Software Engineering Concepts”, 2008.

COMPUTER NETWORKS

18MC3T04

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits: 3	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Perform internal connections between the devices.
- Implement IP address and manipulate within the network.

UNIT – I:

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT – II:

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT – III:

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network, **Elementary Data Link Layer protocols**: simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go back N, Selective repeat-Stop and wait protocol.

UNIT – IV:

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: frequency division multiple access(FDMA), time division multiple access(TDMA), code division multiple access(CDMA).

IEEE Standards: – data link layer, physical layer, Manchester encoding, Standard Ethernet: MAC sub layer, physical layer, Fast Ethernet: MAC sub layer, physical layer, IEEE-802.11: Architecture, MAC sub layer, addressing mechanism, frame structure.

UNIT – V:

Application layer (WWW and HTTP): ARCHITECTURE : Client (Browser) ,Server ,Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan.Third Edition TMH.
2. Computer Networks, 5ed, David Patterson, Elsevier
3. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
4. Computer Networks, Mayank Dave, CENGAGE

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

DESIGN AND ANALYSIS OF ALGORITHMS

18MC3T05

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

CO1 Understand the basic notation for analyzing the performance of the algorithms.
CO2 Describe Divide-and-Conquer Paradigm
CO3 Describe Greedy Paradigm to find the Optimal Solution.
CO4 Describe Dynamic Programming Paradigm
CO5 Describe and Distinguish Backtracking and Branch and Bound Paradigms

UNIT 1 :
Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Solving Recurrence relations, Amortized Analysis
UNIT 2 :
Divide and Conquer Method: General Method, Applications: Binary search, Quick sort, Merge sort, Finding the Maximum and Minimum ,Defective Chessboard.
UNIT 3:
Greedy Method: General method, Applications: Minimum cost spanning tree(Prim's and Kruskal's Algorithms) , Optimal Merge Patterns ,Fractional Knapsack Problem, Single source shortest path, Job Sequencing with Deadlines.
UNIT 4:
Dynamic programming: General Method, Applications: Optimal Binary Search Tree, String Editing, 0/1 knapsack , Travelling Salesperson Problem ,Reliability Design.
UNIT 5 :
Back tracking: General Method, Applications: Sum of Subsets, Hamiltonian Cycles. Graph Coloring,8-Queen Problem.
Branch and bound: General Method , Applications: Travelling Salesman Problem,0/1 Knapsack problem using FIFO and LC Branch and Bound.

Text Books:
1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press
2.Introduction to Algorithmsby Thomas H. Cormen, Charles E. Leiserson ,Ronald L. Rivest, Clifford Stein .PHI Learning.

Reference Books :
1.The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman
2. Algorithm Design, Jon Kleinberg, Pearson.

JAVA PROGRAMMING LAB

18MC3L06

Lecture : 0	**Practical : 4**	**Internal Marks:30**
Credits : 2	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling
5. Design and develop GUI applications

Exercise - 1 (Basics)
a). Write a JAVA program to display default value of all primitive data type of JAVA
b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.
c). Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.
d) Write a case study on **public static void main(250 words)**

Exercise - 2 (Operations, Expressions, Control-flow, Strings)
a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
b). Write a JAVA program to sort for an element in a given list of elements using bubble sort
(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.
(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)
a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.
b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)
a). Write a JAVA program to implement constructor overloading.
b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)
a). Write a JAVA program to implement Single Inheritance
b). Write a JAVA program to implement multi level Inheritance
c). Write a java program for abstract class to find areas of different shapes

Exercise - 6 (Inheritance - Continued)
a). Write a JAVA program give example for “super” keyword.
b). Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?
Exercise - 7 (Exception)
a).Write a JAVA program that describes exception handling mechanism

b).Write a JAVA program Illustrating Multiple catch clauses

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

b). Write a Case study on run time polymorphism, inheritance that implements in above problem.

Exercise – 9 (User defined Exception)

a). Write a JAVA program for creation of Illustrating throw

b). Write a JAVA program for creation of Illustrating finally

c). Write a JAVA program for creation of Java Built-in Exceptions

d).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class .First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)

b). Write a program illustrating **isAlive**and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumerproblem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package.

c). Write a JAVA program that import and use the defined your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b) Write a JAVA program to display analog clock using Applet.

c). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse.

b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

Exercise - 15 (Swings)

a).Write a JAVA programto build a Calculator in Swings

b). Write a JAVA program to display the digital watch in swing tutorial.

Exercise – 16 (Swings - Continued)

a). Write a JAVA program that to create a single ball bouncing inside a JPanel.

b). Write a JAVA program JTree as displaying a real tree upside down

R PROGRAMMING LAB

18MC3L07

Lecture : 0	**Practical : 4**	**Internal Marks:30**
Credits : 2	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

1. Implement the basic concepts of R.
2. Implement the basic data structures in R
3. Implement loops and functions in R
4. Implement mathematical functions and handling files
5. Use various graphical tools in R

1. Write a program to illustrate basic Arithmetic in R
2. Write a program to illustrate Variable assignment in R
3. Write a program to illustrate data types in R
4. Write a program to illustrate creating and naming a vector in R
5. Write a program to illustrate create a matrix and naming matrix in R
6. Write a program to illustrate Add column and Add a Row in Matrix in R
7. Write a program to illustrate Selection of elements in Matrixes in R
8. Write a program to illustrate Performing Arithmetic of Matrices
9. Write a program to illustrate Factors in R
10. Case study of why you need to use a Factor in R
11. Write a program to illustrate Ordered Factors in R
12. Write a program to illustrate Data Frame Selection of elements in a Data frame
13. Write a program to illustrate Sorting a Data frame
14. Write a program to illustrate List ? Why would you need a List
15. Write a program to illustrate Adding more elements into a List
16. Write a program to illustrate if-else-else if in R
17. Write a Program to illustrate While and For loops in R
18. Write a program to illustrate Logical & and Logical | operators in R.
19. Write a program to illustrate Functions in Quick sort implementation in R
20. Write a program to illustrate Function inside function in R
21. Write a program to illustrate to create graphs and usage of plot() function in R
22. Write a program to illustrate Customising and Saving to Graphs in R.
23. Write a program to illustrate some built in Mathematical Functions

SEMESTER IV

SYLLABUS

WEB TECHNOLOGIES

18MC4T01

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

1. Describe the concepts of WWW including browser and HTTP protocol.
2. List the various HTML tags and use them to develop the user friendly web pages.
3. Define the CSS with its types and use them to provide the styles to the web pages at various levels.
4. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
5. Use the JavaScript to develop the dynamic web pages.
6. Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
7. Develop the modern Web applications using the client and server side technologies and the web design fundamentals.

UNIT-I:

Introduction : Concept of WWW, Internet and WWW, HTTP Protocol :Request and Response, Web browser and Web servers, Features of Web Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective Navigation.

UNIT-II:

HTML : Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Website structure. Overview and features of HTML5

Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3.

JavaScript: Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript:

JavaScript and objects, JavaScript own objects, the DOM and web.

UNIT-III:

XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT

UNIT-IV:

PHP : Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP.

UNIT-V:

PHP and MySQL: Basic commands with PHP examples, Connection to Server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHPmyadmin and database bugs

TEXT BOOKS:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press

REFERENCE BOOKS:

1. Web Design, Joel Sklar, Cengage Learning
2.Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
3.Internet and World Wide Web How to program, P.J. Deitel& H.M. Deitel, Pearson

PYTHON PROGRAMMING

18MC4T02

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

OBJECTIVES: The objective of this course is to make students:

1. To define Python functions and call them.
2. To develop Python programs with conditionals and loops.
3. To use Python data structures –, lists, tuples, dictionaries.
4. To learn object- oriented programming concepts.

Outcomes: At the end of the subject, students will be able to:

1. Structure simple Python programs for solving problems.
2. Decompose a Python program into functions.
3. Represent compound data using Python lists, tuples, and dictionaries.
4. Read and write data from/to files in Python Programs.
5. To build software for real needs.

UNIT – I:

Introduction: History of Python, Need of Python Programming, Application Basics of Python, Installing Python in Windows, Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Comments, Input-Output, Indentation.

UNIT – II:

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while, break, continue, pass

UNIT – III:

Data Structures Lists – Introduction, Accessing, Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

Functions- Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default

Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.

UNIT – IV:

Modules: Creating modules, import statement, from. Import statement, name spacing,

Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

Files: Persistence, reading and writing, format operator, filenames and paths, catching exceptions, databases, pipes, writing modules.

Case Study :Brief Tour of the following Standard Packages-System, Date and Time, Math, Random, Numpy, Matplotlib, Multithreading, Internet Access and Turtle Graphics

UNIT – V:

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding,

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

TEXT BOOKS

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. “Python in easy steps In Easy Steps”, Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.

DATA WAREHOUSING AND DATA MINING

18MC4T03

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

1) Understand Data Warehouse fundamentals, Data Mining Principles
2) Design data warehouse with dimensional modeling and apply OLAP operations.
3) Identify appropriate data mining algorithms to solve real world problems
4) Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining

COURSE OBJECTIVES:

1) Identify the scope and necessity of Data Mining & Warehousing for the society.
2) Describe the design of Data Warehousing so that it can be able to solve the root problems.
3) To understand various tools of Data Mining and their techniques to solve the real time problems.
4) To develop ability to design various algorithms based on data mining tools.
5) To develop further interest in research and design of new Data Mining Techniques.

Unit – I Warehouse: What is it, Who Need It, and Why?, Things to Consider, Managing the Data Warehouse, Data Warehouse Design Methodology, Data Marts and Star Schema Design, Fundamentals of ETL Architecture, Partitioning Data, Indexing Data.

Unit – II Data mining: Introduction, Data mining on What Kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining. **Data Preprocessing:** Why Preprocess the Data? Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization.

Unit – III Classification and Prediction: Introduction, Classification by Decision Tree Induction, Bayesian Classification. Other Classification Methods, Classification by Back Propagation, Prediction, Classifier Accuracy.

Unit – IV Association Analysis: Mining Association Rules in large databases - Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multi-Dimensional Association Rules from Relational Databases and Data Warehouses.

Unit – V Cluster analysis – Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density Based Methods: DBSCAN, Grid-Based method: STING, Model Based Clustering Method: Statistical Approach, Outlier Analysis.

Prescribed Books:

1) Michael Corey, Michael Abbey, Ian Abramson, Ben Taub, “Oracle 8i Data Warehousing”, TMH (Unit-I)

2) Jiawei Han Micheline Kamber, “Data mining & Techniques”, Morgan Kaufmann Publishers (Units-II-V)
3) Pang-Ning Tan, Michael Steinbach, Vipin Kumar, “Introduction to Data Mining”, Pearson Publications. (Units-III-V)

Reference Books:

1) S.N.Sivanandam, S.Sumathi, “Data Mining – Concepts, Tasks and Techniques”, Thomson (2006).
2) Ralph Kimball, “The Data Warehousing Toolkit”, Wiley.
3) Margaret H. Dunham, “Data mining - Introductory and advanced topics”,Pearson Education.
4) D.Hand, H. Mannila and P.Smyth, “Principles of Data mining”, PHI (2001).

E COMMERCE

18MC4T04

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

UNIT-I: Electronic Commerce
Introduction, Anatomy of E Commerce Applications, E Commerce Consumer , Applications, E Commerce organization Applications, Consumer oriented E commerce, Mercantile Process Models
UNIT-II: Electronic Payment Systems
Introduction, Digital Token Based Systems, Smart Cards, Credit Cards, Risks in Electronic Payment Systems, Inter Organizational Commerce, EDI- EDI Implementation, Value Added Networks
UNIT-III: Inter Organizational Commerce
Introduction to Inter Organizational Commerce, Workflow, Automation, Customization , Internal Commerce, Supply Chain Management
UNIT-IV: Corporate Digital Library
Document Library, Digital Document Types, Corporate Data Warehouses, Advertising and Marketing, Information Bases Marketing, Advertising on Internet, Online Marketing Process, Market Research
UNIT-V: Consumer Search and Resource Discovery& Multimedia
Introduction, Information Search and Retrieval, Commerce Catalogues, Information Filtering, Key Multimedia Concepts, Digital Video and Electronic Commerce, Desktop Video Processing
TEXT BOOKS:
1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson
REFERNCE BOOKS:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol GuyericoTra

CRYPTOGRAPHY AND NETWORK SECURITY
(Elective)

18MC4T05

Lecture :	**3**	**Practical :**	**0**	**Internal Marks:30**
Credits :	**3**	**Tutorial :**	**0**	**External Marks:70**

COURSE OBJECTIVES:

At the end of the course the student is able to understand

- Basics of Information Security
- How to provide security with Symmetric Encryption Methods
- How to provide security with Asymmetric Encryption Methods
- About E-Mail Privacy
- Web Security
- Basic principles of SNMP
- About Firewalls

COURSE OUTCOMES:

1. Be able to individually reason about software security problems and protection techniques on both an abstract and a more technically advanced level.
2. Be able to individually explain how software exploitation techniques, used by adversaries, function and how to protect against them.

UNIT I : Classical Encryption Techniques

Introduction: Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Cyber threats and their defense(Phishing Defensive measures, web based attacks, SQL injection & Defense techniques)(TEXT BOOK 2), Buffer overflow & format string vulnerabilities, TCP session hijacking(ARP attacks, route table modification) UDP hijacking (man-in-the-middle attacks)(TEXT BOOK 3).

UNIT II: Block Ciphers & Symmetric Key Cryptography

Traditional Block Cipher Structure, DES, Block Cipher Design Principles, AES-Structure, Transformation functions, Key Expansion, Blowfish, CAST-128, IDEA, Block Cipher Modes of Operations

UNIT III: Number Theory & Asymmetric Key Cryptography

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms.

Public Key Cryptography: Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elgamal encryption & decryption, Elliptic Curve Cryptography.

UNIT IV: Cryptographic Hash Functions & Digital Signatures, IP Security

Application of Cryptographic hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC& CMAC. Digital Signatures, NIST Digital Signature Algorithm. Key management & distribution.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT V: User Authentication, Transport Layer Security & Email Security, Intrusion detection systems
User Authentication: Remote user authentication principles, Kerberos
Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell(SSH)
Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.
Intrusion detection: Overview, Approaches for IDS/IPS, Signature based IDS, Host based IDS/IPS. (TEXT BOOK 2)

TEXT BOOKS:

1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition.
2. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC press
3. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech.

REFERENCE BOOKS:

1. Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford
2. Network Security & Cryptography, Bernard Menezes, Cengage, 2010

Distributed Systems

18MC4T06

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

The student should be made to:

- Understand foundations of Distributed Systems.
- Understand about various issues in Inter-process communication.
- Introduce the idea of peer to peer services and file system.
- Understand in detail the system level and support required for distributed system.
- Understand the issues involved in distributed transactions & concurrency control.

UNIT I

Examples of Distributed Systems–Trends in Distributed Systems, Focus on resource sharing, Challenges, Case study: World Wide Web.

System Models – Physical Model, Architectural Model, Fundamental Model.

UNIT II

Interprocess Communication: Introduction, The API for the Internet Protocols, The Characteristics of Interprocess communication. Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling;

Multicast Communication – IP Multicast, Reliability & ordering of multicast; Network virtualization: Overlay networks – Example.

UNIT III

Peer-to-peer Systems – Introduction, Napster and its legacy, Peer-to-peer, Middleware, Routing overlays, Overlay case studies: Pastry, Tapestry.

Distributed File Systems – Introduction, File service architecture, Network File system, Andrew File system, Enhancements and further developments.

UNIT IV

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects-Object Model, Distributed Object Model; Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVARMI

Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads - Address Space, Creation of a New Process, Threads.

UNIT V

Transactions and Concurrency Control– Transactions -Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control, **Distributed Transactions** - Flat and nested distributed transactions, Atomic Commit protocols, Concurrency Control in Distributed

Transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication.
2. Ajay D Kshemkalyani, MukeshSighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge.

ARTIFICIALINTELLIGENCE

(Elective)

18MC4T07

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

COURSEOBJECTIVES:

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation , exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

UNIT-I

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.
ProblemSolving-State-SpaceSearchandControlStrategies:Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction. Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

UNIT-II

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.
Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR.

UNIT-III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure-Probability Theory: Introduction ,Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

UNIT-IV

Machine-Learning Paradigms: Introduction. Machine Learning Systems, Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees, Deductive Learning. Clustering, Support Vector Machines.

UNIT-V

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward

Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

TEXTBOOKS:

1. SarojKaushik.ArtificialIntelligence.CengageLearning.20112. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, SecondEdition.2004

REFERENCEBOOK:

1. Rich, Knight, Nair:Artificialintelligence,TataMcGrawHill,ThirdEdition2009.
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3. IntroductiontoArtificialIntelligenceandexpertsystemsDanW.Patterson.PHI.
4. Artificial Intelligence by George Flugerrearson fifth edition.

PYTHON PROGRAMMING LAB

18MC4L08

Lecture: 0	**Practical : 4**	**Internal Marks:30**
Credits : 2	**Tutorial : 0**	**External Marks:70**

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a python program to compute distance between two points taking input from the user (Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

c) Write a program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :

Grade A: Percentage >=80

Grade B: Percentage>=70 and <80

Grade C: Percentage>=60 and <70

Grade D: Percentage>=40 and <60

Grade E: Percentage<40

c) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10

d) Write a program using a for loop that loops over a sequence. What is sequence ?

e) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Exercise 4 - Control Flow – Continued

Find the sum of all the primes below two million. Each new term in the Fibonacci sequence is generated by

adding the previous two terms. By starting with 1and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

a) By considering the terms in the Fibonacci sequence,find the sum of the even-valued terms.

Exercise - 5 - DS

a) Write a Python program using string slices and methods.

b) Implement a Python program using Lists and perform various operations.

c) Write a Python program to implement Dictionaries.

Exercise - 6 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

c) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise – 7 Functions

a) Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Write a function cumulative_product to compute cumulative product of a list of numbers.

Exercise - 8 Functions - Continued

a) Write a python program to display the powers of 2 using anonymous function.

b) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

c) Write a Python program to implement

a) Linear search

b) Binary search using functions.

Exercise 10 – Numpy Module

a) Write a program to perform addition of two square matrices

b) Write a program to perform multiplication of two square matrices

Exercise - 11 – Internet Access Module

a) Write a script that imports requests and fetch content from the page. Eg. (Wiki)

b) Write a simple script that serves a simple HTTP Response and a simple HTML Page

Exercise -12 Visualization Modules

a) WAP to read n integers and display them as a histogram.

b) WAP to display sine, cosine, polynomial and exponential curves.

c) WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.

d) Develop a Python program that implements the Turtle module.

Exercise - 13 OOP

a) Write a python program to demonstrate Constructors.

b) Write a python program to demonstrate Inheritance

c) Write a python program to handle Runtime Exceptions.

18MC4L10

WEB TECHNOLOGIES LAB

18MC4L09

Lecture : 0	**Practical : 4**	**Internal Marks:30**
Credits : 2	**Tutorial : 0**	**External Marks:70**

1. Design multiple webpages with navigation facility by utilizing all the html elements in Unit II
2. Design multiple page website with different types of styling like Inline Internal and External.
   Note: By the end of this task student should be clear on cascading.
3. Design a webpage to perform client side actions like validations and all using JavaScript.
4. Example on usage of DTD.
5. Example on usage of Schema.
6. Different examples using XSL and XSLT.
7. Develop a website to use PHP Cookies for Logins of Different users
8. Develop a website to use PHP MYSQL for Logins of Different users
9. Example using PHP Arrays All types.
10. Example using PHP Sessions and use them in handling a website with login system.
11. Develop an attractive Web site for an event to be organized in your institute.
12. Develop a Web based application to manage the Visiting Cards which allows user to add new cards, delete the cards, update the cards etc.
13. Develop a web based application for online purchasing of products with payment facility

Object Oriented Analysis and Design Lab

Lecture : 0 **Practical : 4** **Internal Marks:30**
Credits : 2 **Tutorial : 0** **External Marks:70**

OBJECTIVES:

• Construct UML diagrams for static view and dynamic view of the system.
• Generate creational patterns by applicable patterns for given context.
• Create refined model for given Scenario using structural patterns.
• Construct behavioral patterns for given applications.

Case Study 1: ATM
Case Study 2: Library Management System
Case Study 3: Railway Reservation System
Case Study 4: Online Shopping

Week 1:
Familiarization with Rational Rose or Umbrello
For each case study:
Week 2, 3 & 4:
For each case study:
• a) Identify and analyze events
• b) Identify Use cases
• c) Develop event table
• d) Identify & analyze domain classes
• e) Represent use cases and a domain class diagram using Rational Rose
• f) Develop CRUD matrix to represent relationships between use cases and problem domain classes

Week 5 & 6:
• **For each case study:**
• a) Develop Use case diagrams
• b) Develop elaborate Use case descriptions & scenarios
• c) Develop system sequence diagrams

Week 7, 8, 9 & 10:
For each case study:
• a) Develop high-level sequence diagrams for each use case
• b) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects
• c) Develop detailed design class model (use GRASP patterns for responsibility assignment)
• d) Develop three-layer package diagrams for each case study

Week 11 & 12:
For each case study:
• a) Develop Use case Packages
• b) Develop component diagrams
• c) Identify relationships between use cases and represent them

• d) Refine domain class model by showing all the associations among classes

Week 13
For each case study:
a) Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

OUTCOMES:
- Understand the Case studies and design the Model.
- Understand how design patterns solve design problems.
- Develop design solutions using creational patterns.
- Construct design solutions by using structural and behavioral patterns

EMPLOYABILITY SKILLS: Arithmetic and Logical Reasoning

III Year - II Semester **Course Code: 18CS6T07**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

SYLLABUS

UNIT-I

Divisibility and remainder rules of numbers, Unit digit, square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

UNIT-II

Profit & loss, Simple interest and Compound Interest Direction, Order and Ranking, Sitting arrangement and Puzzle

UNIT-III

Ratio & proportions, Partnership, Alligation and mixtures and Ages**.** Data sufficiency, Inequalities and Decision making.

UNIT-IV

Time and work, Pipes & cisterns and Time and distance. Syllogism, Statement and course of action and Statement and Assumption.

UNIT-V

Boats and streams, Areas, Volume and surface areas. Statement and argument, Cause and effect and Drawing inference.

Note: Students shall be able to solve the problems to the standard of examinations like GRE and CAT TEXT BOOKS:

1) "Objective Arithmetic" by R.S. Agarwal, S. Chand Publications.
2) Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

REFERENCES:

1) Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2) .Quantitative Aptitude by Abhjit Guha.
3) Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

SEMESTER V

SYLLABUS

SOFTWARE TESTING METHADOLOGIES

V Semester- MCA

18MC5T01

Lecture : 3	**Practical :**	**0**	**Internal Marks:40**
Credits : 3	**Tutorial :**	**0**	**External Marks:60**

COURSE OBJECTIVES:

1) To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2) To Understand different levels of Testing
3) Apply Black Box and White Box Testing Techniques
4) To learn how to plan a test project, design test cases and data, conduct testing operations, and generate a test report.
5) To understand software test automation problems and solutions.

COURSE OUTCOMES:

1) Have an ability to apply software testing knowledge and engineering methods.
2) Ability to identify the needs of software test automation, and define a test tool to support test automation.
3) Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
4) Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
5) Apply techniques and skills to use modern software testing tools to support software testing projects.

SYLLABUS

UNIT I:

Software Testing: Introduction, Evolution, Dichotomies, Goals & Typical Objectives of Testing, Model for testing, Software Testing Principles

Software Testing Terminology and Methodology: Software Testing Terminology, Errors, Defects, Failures, Root Causes and Effects, Software Testing Life Cycle, Software Testing Methodology.

UNIT II:

Verification and Validation: Verification & Validation Activities, Categories of Test Techniques: Dynamic

Testing,

Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing,

White-Box Testing: Need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing

UNIT III:

Experience Based Testing Techniques: Error Guessing, Exploratory Testing, Checklist- based Testing

Static Testing: Inspections, Structured Walkthroughs, Technical reviews, Benefits of Static Testing, Static Vs Dynamic Testing.

Levels of Testing: Unit testing, Integration Testing,. Function testing, System testing and Acceptance testing.

Regression testing: Progressive Vs Regressive testing, Objectives of regression testing, Regression testing techniques

UNIT IV:

Test Management: Test Organization, Test Planning, Test Design and Test case specifications, Structure of a Testing Group, Reasons for the growth of a Test suite, Test suite Minimization, Test suite prioritization, Types of test case prioritization, prioritization techniques, Measuring the effectiveness of a prioritized test suite.

Debugging: Debugging process, Debugging Techniques, Correcting Bugs, Debuggers

UNIT V:

Automation and Testing Tools: Need for automation, Testing Tool Considerations, Test Tool Classification, Benefits and Risks of Test automation, Special Considerations for Test execution and Test Management Tools, Principles for tool selection, Testing tools- success factors, Guidelines for automated testing, overview of some commercial testing tools.

TEXT BOOKS:

1.Software testing techniques - Baris Beizer, International Thomson computer press, second edition.
(Unit 1)

2.Software Testing, Principles and Practices, Naresh Chauhan, Oxford Publishers(Unit 2,3,4,5)

REFERENCES

1. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH

HADOOP & BIG DATA

V Semester- MCA

18MC5T02

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1) Optimize business decisions and create competitive advantage with Big Data analytics
2) Introducing Java concepts required for developing map reduce programs
3) Derive business benefit from unstructured data
4) Imparting the architectural concepts of Hadoop and introducing map reduce paradigm

COURSE OUTCOMES:

1) Understand methods for data summarization, query, and analysis.
2) Apply data modeling techniques to large data sets
3) Creating applications for Big Data analytics
4) Building a complete business data analytic solution.
5) Understand programming tools PIG & HIVE in Hadoop eco-system.

SYLLABUS

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Data node, Secondary Name node, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing Map Reduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop Map Reduce: Driver code, Mapper code,
Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

UNIT-V

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

TEXT BOOKS:

1) Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC (Unit 1)
2) Hadoop: The Definitive Guide by Tom White, 3 Edition, O'reilly(Unit 2,3,4)
3) Hadoop in Action by Chuck Lam, MANNING Publ.9(Unit 2)
4) Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss (Unit 5)

REFERENCE BOOKS:

1) Hadoop in Practice by Alex Holmes, MANNING Publ.
2) Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne

MOBILE COMPUTING

V Semester- MCA

18MC5T03

Lecture : 3	**Practical : 0**	**Internal Marks: 40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1) To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.

2) To understand the typical mobile networking infrastructure through a popular GSM protocol.

3) To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer.

4) To understand the database issues in mobile environments & data delivery models.

5) To understand the ad hoc networks and related concepts.

COURSE OUTCOMES:

1) Develop new mobile applications.

2) Identify solutions to the technical issues in the mobile communication paradigm.

3) Understand the ad hoc network applications and/or algorithms/protocols.

4) Understand & develop any existing or new protocol related to mobile environment.

5) Understand the platforms and protocols used in mobile environment

SYLLABUS

UNIT-I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT–II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed Terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/ (IEEE 802.11)

UNIT–III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location

Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT–IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT-V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing methods, Data Synchronization – Introduction, Software, and Protocols.

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.(Units 1,2,3)
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772(Units 4,5)

REFERENCES:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, “Mobile Computing, Technology Applications and Service Creation” Second Edition, McGraw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, “Principles of Mobile Computing,” Second Edition, Springer.

(Elective II)

MACHINE LEARNING & DEEP LEARNING

V Semester MCA

18MC5T04

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1) To introduce students to the basic concepts and techniques of Machine Learning and deep learning.
2) To develop skills of using recent deep learning software for solving practical problems.
3) To gain experience of doing independent study and research.

COURSE OUTCOMES:

1) Understand the basic concepts of concept learning
2) Understand the concepts of evaluating the hypothesis
3) Understand the concept behind neural networks for learning non-linear functions.
4) Develop a deep neural network for image classification
5) Develop a deep network for sequence data analysis

SYLLABUS

UNIT-I

Introduction: Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning.(Text Book 1)

Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.(Text Book 1)

UNIT-II

Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms. (Text Book 1)

Features: Kinds of feature, Feature transformations, Feature construction and selection. (Text Book 2). Model ensembles: Bagging and random forests, Boosting (Text Book 3)

UNIT-III

Artificial Neural Networks: Introduction, Neural Network representation, Perceptrons, multi layer perceptron, Feed

forward neural network, Training Neural Network: Risk minimization, loss function, regularization, model selection, and optimization, Back propagation with case study (Text Book 1)

UNIT-IV

Deep Learning: Deep Feed Forward network, regularizations, training deep models, dropouts, Convolution Neural Network.

UNIT-V

Recurrent Neural Network, Autoencoders

Introduction to Deep Learning Tools: Tensor Flow, keras

TEXT BOOKS:

1) Tom M. Mitchell, "Machine Learning" , India Edition 2013, McGraw Hill Education (Unit 1, 2, 3)
2) Huan Liu and Hiroshi Motoda, "Feature Selection For Knowledge Discovery And Datamining" ,Springer Science + Business Media, LLC 1998. (Unit 2)
3) Cha Zhanga and YunqianMa , "Ensemble Machine Learning Methods and Applications", Springer Science + Business Media, LLC 2012 (Unit 2)
4) Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016. (Unit 4)

REFERENCES:

1. Deep Learning with python by Francois Chollet, Manning Publications.
2. Hands-on Machine Learning with Scikit-learn and TensorFlow by AurelienGeron, O'Reilly Media,2017
3. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

(Elective II)

CLOUD COMPUTING

V Semester MCA

18MC5T05

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1) Explain the technology and principles involved in building a cloud environment
2) Apply Map-Reduce concept to applications.
3) To implement Virtualization
4) Contrast various programming models used in cloud computing
5) Choose appropriate cloud model for a given application.

COURSE OUTCOMES:

1) Explain and characterize different cloud deployment models and service models
2) Understand different cloud programming platforms and tools\
3) Illustrate Virtualization for Data-Center Automation.
4) Identify the security issues in cloud computing
5) Understand various basic concepts related to cloud computing technologies

SYLLABUS

UNIT-I

Introduction and Evolution of Computing Paradigms: Overview of Existing Hosting Platforms, Cluster Computing, Grid Computing, Utility Computing, Autonomic Computing, Green Computing, Cloud Computing, history and evolution, practical applications of cloud computing for various industries, IoT, economics and benefits of cloud computing, spot markets, pricing models, Supercomputing-on-demand.

UNIT-II

Cloud Issues and Challenges: Cloud computing issues and challenges like Security, Elasticity, Resource management and Scheduling, QoS (Quality of Service) and Resource Allocation, Cost Management, Big Data, Pre-reservation and Cloud

bursting.

Cloud Computing Architecture: Cloud Architecture model, Types of Clouds: Public Private & Hybrid Clouds, Cloud based services: Iaas, PaaS and SaaS .

UNIT-III

Data Center: Classic Data Center, Virtualized Data Center (Compute, Storage, Networking and Application), Business Continuity in VDC.

Virtualization: Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization: Resource Virtualization i.e. Server, Storage and Network virtualization, Migration of processes, VMware vCloud – IaaS

UNIT-IV

Cloud based Data Storage: Introduction No-SQL databases, Map-Reduce framework for Simplified data processing on Large clusters using Hadoop, Design of data applications based on Map Reduce in Apache Hadoop, Task Partitioning, Data partitioning, Data Synchronization, Distributed File system, Data Replication , Shared access to weakly consistent to data stores

UNIT-V

Classification of Cloud Implementations: Amazon Web Services, The Elastic Compute Cloud (EC2), The Simple Storage Service (S3), The Simple Queuing Services (SQS), Google AppEngine - PaaS, Windows Azure, Aneka, Hadoop, Microsoft Dynamics CRM, A Comparison of Cloud Computing Platforms.

TEXT BOOKS:

1. Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, Cloud Computing: Principles and paradigms, MIT Press (2011). (Units 1,2)
2. Cloud Computing: A practical Approach Anthony Velte, Toby Velte and Robert Elsenpeter by Tata McGrawHill (2009). (Unit 5)
3. Michael Miller, Cloud Computing, Que Publishing (2008).(Unit 3,4)

REFERENCES:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, F Halper, Cloud Computing for dummies (2009).
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier

4. Hwang, Kai, Jack Dongarra, and Geoffrey C. Fox. Distributed and cloud computing: from parallel processing to the internet of things. Morgan Kaufmann, 2013.

(Elective II)

HUMAN COMPUTER INTERACTION

V Semester MCA

18MC5T06

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

- Explain the capabilities of both humans and computers from the viewpoint of human information processing.
- To make the student think constructively and analytically about how to design and evaluate interactive technologies.

COURSE OUTCOMES:

1) Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
2) Apply an interactive design process and universal design principles to designing HCI systems.
3) Understand the importance of Natural Languages in computing interactions.
4) Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
5) Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

SYLLABUS

UNIT-I

Introduction: Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession.

Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues.

UNIT-II

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus,

Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

UNIT-III

Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

UNIT-IV

Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

UNIT-V

User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process.

TEXT BOOKS:

1. Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson (Units 1, 2, 3, 4)

2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech. (Unit 5)

REFERENCE BOOKS:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

2. Designing the user interface. 4/e, Ben Shneidermann , PEA.

3. User Interface Design, Soren Lauesen , PEA.

4. Interaction Design PRECE, ROGERS, SHARPS, Wiley.

(Elective III)

INTERNET OF THINGS

V Semester MCA

18MC5T07

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using

Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on-Approach”, VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, “Getting Started with Raspberry Pi”, O’Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram “ Internet of Things” Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, John Wiley andSons2014.

(Elective III)

SOFTWARE PROJECT MANAGEMENT

V Semester MCA

18MC5T08

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases

Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis. **Risk**

Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT-IV

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT-V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality, Quality plan of ACIC project.

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson. (Units 1, 2, 3, 4, 5)
2. Software Project Management, Walker Royce: Pearson Education (Units 4, 5)

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

(Elective III)

DATA ANALYTICS

V Semester MCA

18MC5T09

Lecture : 3	**Practical : 0**	**Internal Marks:40**
Credits : 3	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1. To understand Data Analytics lifecycle and Business Challenges.
2. To understand Analytical Techniques
3. To understand various tools and technologies to handle big data

COURSE OUTCOMES:

1. Understand big data and data analytics life cycle.
2. Explore various supervised learning methods.
3. Explore various unsupervised learning methods.
4. Understand and apply ARIMA model on time series data.
5. Learn various technology and tools in big data analytics.

SYLLABUS

UNIT-I

Introduction to Big Data Analytics: Big Data Overview, State of the Practice in Analytics, Key Roles for the new big data Ecosystem, Examples of Big Data Analytics.

Data Analytics Life Cycle: Data Analytics life cycle Overview, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize, Case Study.

UNIT-II

Supervised Learning: Decision Trees – Overview of Decision Trees, The General Algorithm, Decision Tree Algorithms, Evaluating a Decision Tree. **Naive Bayes:** Baye's Theorem, Naïve Baye's Classifier, Diagnostics of Classifiers.

Regression –Linear Regression, Logistic Regression.

UNIT-III

Unsupervised Learning: Association Rule Mining–Overview, Apriori Algorithm, Evaluation of Candidate Rules, Applications of Association Rules.

Cluster Analysis –Overview of Clustering, k-means

UNIT IV

Time Series Analysis: Overview of Time Series Analysis, ARIMA Model

Text Analysis: Text Analysis Steps, Example, Collecting Raw Data, Representing Text, TFIDF, Categorizing Documents by Topics, Determining Sentiments, Gaining Insights.

UNIT-V

Technology and Tools: MapReduce and Hadoop- Analytics for Unstructured Data, The Hadoop Ecosystem

In-DataBase Analytics: SQL Essentials, In-Database Text Analysis, Advanced SQL.

TEXT BOOKS:

1. David Dietrich, Barry Hiller, “Data Science and Big Data Analytics”, EMC education services, Wiley publications, 2012.

REFERENCE BOOKS:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.

2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O‟ Reilly, 2011.

3. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

BIG DATA & HADOOP LAB

V Semester MCA

18MC5L10

Lecture : 0	**Practical : 4**	**Internal Marks:40**
Credits : 2	**Tutorial : 0**	**External Marks:60**

COURSE OUTCOMES:

1) Preparing for data summarization, query and analysis.
2) Applying data modeling techniques to large data sets.
3) Creating applications for Big data Analytics.
4) Building a complete business data analytic solution.

LIST OF LAB EXPERIMENTS

Week 1, 2:

1. Implement the following Data structures in Java

a) Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3, 4:

2. (i) Perform setting up and Installing Hadoop in its three operating modes:

- Standalone,
- Pseudo distributed,
- Fully distributed
- (ii)Use web based tools to monitor your Hadoop setup.

Week 5:

3. Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files
- Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 6:

4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Week 7:

5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

Week 8:

6. Implement Matrix Multiplication with Hadoop Map Reduce

Week 9, 10:

7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter yourdata.

Week 11, 12:

8. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views,
functions, and indexes

MOBILE APPLICATION DEVELOPMENT LAB

V Semester MCA

18MC5L11

Lecture : 0	**Practical : 4**	**Internal Marks:40**
Credits : 2	**Tutorial : 0**	**External Marks:60**

COURSE OBJECTIVES:

1. Design and develop a mobile client Server System using a standard Java and J2ME platform.

2 Design implement a system that consists of a mobile client (MC) and a Proxy Server (PS).

COURSE OUTCOMES:

1) Develop user interfaces for mobiles.

2) Develop simple mobile applications

3) Develop mobile application to provide database interactions

4) Develop mobile application to support multi-tier architectures

System/Software Requirements:

.Intel based desktop PC

.Java Wireless Toolkit 2.5.2_01

PROGRAMS LIST:

1. Write a J2ME program to show how to change the font size and colour.

2. Write a J2ME program which creates the following kind of menu.

* cut
* copy
* past
* delete
* select all
* unselect all

3. Create a J2ME menu which has the following options (Event Handling):

*cut - can be on/off

*copy - can be on/off

*paste - can be on/off

*delete - can be on/off

*select all - put all 4 options on

*unselect all - put all

4. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.

5. Create an MIDP application which examine, that a phone number, which a user has entered is in the given format (Input checking):

* Area code should be one of the following: 040, 041, 050, 0400, 044

* There should 6-8 numbers in telephone number (+ area code)

6. Write a sample program to show how to make a SOCKET Connection from J2ME phone. This J2MEsample program shows how to how to make a SOCKET Connection from a J2ME Phone. Many a times there is a need to connect backend HTTP server from the J2ME application. Show how to make a SOCKET connection from the phone to port 80.

7. Login to HTTP Server from a J2ME Program. This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server. Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server. Note: Use Apache Tomcat Server as Webserver and MySQL as Database Server.

8. The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

- Students Marks Enquiry
- Town/City Movie Enquiry
- Railway/Road/Air (For example PNR) Enquiry/Status
- Sports (say, Cricket) Update
- Town/City Weather Update
- Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry

Divide Student into Batches and suggest them to design database according to their domains and render

information according the requests.

9. Write an Android application program that displays Hello World using Terminal.

10. Write an Android application program that displays Hello World using Eclipse.

11. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse.

12. Write an Android application program that demonstrates the following:

(i) Linear Layout

(ii) Relative Layout

(iii) Table Layout

(iv) Grid View layout

13. Write an Android application program that converts the temperature in Celsius to Fahrenheit.

14. Write an Android application program that demonstrates intent in mobile application development.

PROJECT- I

18MC5L12

Lecture : 0	**Practical : 4**	**Internal Marks:100**
Credits : 2	**Tutorial : 0**	**External Marks:**

- The students are expected to take up an internship program with prior approval from the Department committee after their IV semester during the summer break which will be evaluated in the V Semester.
- If the student was unable to take up in the internship program he/she has to take up a project work and will be evaluated here by the Department Internal Evaluation Committee
- Continues Internal evaluation will be done for 40 Marks
- Final evaluation will be done for 60 Marks
- A detailed report on the progress project work is to be submitted in each review.

MCA VI semester

TECHNICAL SEMINAR

18MC6L01

Lecture : 0	**Practical : 0**	**Internal Marks:100**
Credits : 3	**Tutorial : 3**	**External Marks:**

- Student has to give a detailed presentation on a topic of his interest for 30 Minutes which will be evaluated by the internal committee

PROJECT-II

18MC6L02

Lecture : 0	**Practical : 32**	**Internal Marks: 40**
Credits : 16	**Tutorial : 3**	**External Marks: 60**

- The student has to take up the project work in the VI semester which will be evaluated both by the internal committee and external committee.
- The student is expected to demonstrate his research skills and propose a solution to the research problems identified.
- Continues Internal evaluation shall be done for 40 Marks
- Final evaluation shall be done by an external examiner for 60 Marks
- The student shall submit a detailed report on the project work at the time of evaluation.

Department of Civil Engineering

Course Structure for Semester -I

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE1T01	HSMC	English-I	2	-	-	2	2
2	18CE1T02	BSC	Linear Algebra & Differential Equations	3	1	-	4	4
3	18CE1T03	BSC	Engineering Chemistry	3	-	-	3	3
4	18CE1T04	ESC	Problem Solving through C	3	-	-	3	3
5	18CE1T05	ESC	Engineering Mechanics	3	1	-	4	4
6	18CE1L06	HSMC	English Communication Skill Lab-1	-	-	2	2	1
7	18CE1L07	BSC	Engineering Chemistry Lab	-	-	3	3	1.5
8	18CE1L08	ESC	Problem Solving through C Lab	-	-	3	3	1.5
9	18CE1T09	MC	Environmental Studies	2	-	-	2	-
Total number of credits								**20**

Course Structure for Semester -II

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE2T01	HSMC	English – II	1	-	2	3	2
2	18CE2T02	BSC	Vector Calculus & Fourier Transforms	3	-	-	3	3
3	18CE2T03	BSC	Engineering Physics	3	-	-	3	3
4	18CE2L04	BSC	Biology for Engineers	2	-	-	2	2
5	18CE2T05	ESC	Basic Electrical & Electronics Engineering	3	-	-	3	3
6	18CE2T06	ESC	Engineering Graphics	3	-	-	3	3
7	18CE2L07	ESC	Engineering Physics Lab	-	-	3	3	1.5
8	18CE2L08	ESC	Basic Electrical & Electronics Engineering Lab	-	-	2	2	1
9	18CE2L09	ESC	Basic Engineering & IT Workshop	-	-	3	3	1.5
Total number of credits								**20**

Course Structure for Semester - III

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE3T01	HSMC	Humanities (Effective Technical Communication)	3	-	-	2	3
2	18CE3T02	BSC	Numerical Methods and Probability Statistics	3	-	-	3	3
3	18CE3T03	BSC	Life Science	2	-	-	2	2
4	18CE3T04	PEC	Professional Elective- I	2	-	-	2	2
5	18CE3T05	PCC	Strength of Materials- I	3	-	-	3	3
6	18CE3T06	PCC	Fluid Mechanics	3	-	-	3	3
7	18CE3T07	PCC	Surveying	3	-	-	3	3
8	18CE3L08	PCC	Strength of Materials Lab	-	-	3	3	1.5
9	18CE3L09	PCC	Surveying Field Work -I	-	-	3	3	1.5
10	18CE3N10	MC	Management 1 (Organizational Behavior)	2	-	-	2	0
							Total number of credits	**22**

Course Structure for Semester - IV

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE4T01	HSMC	Professional Practice, Law & Ethics	2	-	-	2	2
2	18CE4T02	ESC	Energy science & Engineering	2	-	-	2	2
3	18CE4T03	ESC	Building Planning and Drawing	3	1	-	4	4
4	18CE4T04	PEC	Professional Elective – II	2	1	-	3	3
5	18CE4T05	PCC	Concrete Technology	3	-	-	3	3
6	18CE4T06	PCC	Hydraulic Engineering	2	1	-	3	3
7	18CE4L07	PCC	Surveying Field Work – II	-	-	4	4	2
8	18CE4L08	PCC	Concrete Technology Lab	-	-	3	3	1.5
9	18CE4L09	PCC	Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	3	1.5
							Total number of credits	**22**

Course Structure for Semester - V

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE5T01	PCC	Engineering Geology	2	-	-	2	2
2	18CE5T02	PCC	Transportation Engineering	2	-	-	2	2
3	18CE5T03	PCC	Structural Analysis	2	1	-	3	3
4	18CE5T04	PCC	Geotechnical Engineering	2	1	-	3	3
5	18CE5T05	PCC	Hydrology &Water Resources Engineering	2	1	-	3	3
6	18CE5T06	PCC	Structural Engineering -I (RCC)	3	-	2	4	4
7	18CE5L07	PCC	Engineering Geology Lab	-	-	3	3	1.5
8	18CE5L08	PCC	Geotechnical Engineering Lab	-	-	3	3	1.5
9	18CE5N09	MC	Constitution of India/ Essence of Indian Traditional Knowledge	2	-	-	2	0
							Total number of credits	**20**

Course Structure for Semester - VI

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE6T01	PCC	Structural Engineering – II (Steel)	2	1	-	3	3
2	18CE6T02	PCC	Environmental Engineering-I	3	-	-	3	3
3	18CE6T03	PEC	Professional Elective-III	2	1	-	3	3
4	18CE6T04	PEC	Professional Elective -IV	2	-	-	2	2
5	18CE6T05	OEC	Open Elective – I	3	-	-	3	3
6	18CE6T06	OEC	Open Elective – II	3	-	-	3	3
7	18CE6L07	PCC	Architectural Planning and CAD Lab	-	-	3	3	1.5
8	18CE6L08	PCC	Transportation Engineering Lab	-	-	3	3	1.5
							Total number of credits	**20**

Course Structure for Semester - VII

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE7T01	PCC	Estimation, Costing and Valuation	2	1	-	3	3
2	18CE7T02	PEC	Professional Elective – V	3	-	-	3	3
3	18CE7T03	PEC	Professional Elective – VI	3	-	-	3	3
4	18CE7T04	PEC	Professional Elective – VII	3	-	-	3	3
5	18CE7T05	OEC	Open Elective – III	3	-	-	3	3
6	18CE7L06	PCC	STAAD Pro& GIS Lab	-	-	3	3	1.5
7	18CE7L07	PCC	Environmental Engineering Lab	-	-	3	3	1.5
8	18CE7L08	PROJ	Internship/ Social Responsibility Project	-	-	2	2	2
							Total number of credits	**20**

Course Structure for Semester - VIII

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CE8T01	PEC	Professional Elective -VIII	2	-	-	2	2
2	18CE8T02	PEC	Professional Elective - IX	2	-	-	2	2
3	18CE8T03	OEC	Open Elective – IV	3	-	-	3	3
4	18CE8L04	PROJ	MOOCs/ Survey Camp	-	-	2	2	1
5	18CE8L05	PROJ	Project	-	-	8	8	8
							Total number of credits	**16**

Professional Elective I:

1. Building Materials and construction
2. Rural Water Supply and Onsite Sanitation
3. Infra Structure Planning &Management
4. Architecture and Town Planning

Professional Elective II:

1. Strength of Materials II
2. Environmental Geo-technology
3. Green Technologies
4. Disaster Management

Professional Elective III:

1. Structural Analysis – II
2. Introduction to Composite Materials
3. Advanced Structural Engineering
4. Air Pollution and Control

Professional Elective IV:

1. Transportation Engineering-II
2. Advanced Surveying
3. Ground Water Development and Management
4. Geosynthetics

Professional Elective V:

1. Water Resources Engineering-II
2. Design & Drawing of Irrigation Structures
3. Advanced Foundation Engineering
4. Solid Waste Management

Professional Elective VI:

1. Environmental Engineering–II
2. Theory and Applications of Cement Composites
3. Pavement Design
4. Repair and Rehabilitation of Structures

Professional Elective VII:

1. Geotechnical Engineering - II
2. Bridge Engineering
3. Finite Element Methods
4. Ground Improvement Techniques

Professional Elective VIII:

1. Prestressed Concrete
2. Building Services and Maintanence
3. Urban transportation engineering
4. Earth Quake Resistant Structures

Professional Elective IX:

1. Construction Technology and Management
2. Port and Harbour structures
3. Elements of Earthquake Engineering
4. Traffic Engineering

I

SEMESTER

SYLLABUS

ENGLISH-I

I SEMESTER

Lecture:2 Practical:0 Internal Marks: 30

Credits: 2 Tutorial:0 External Marks:70

Prerequisites: -

Course Outcomes:

1. CO 1: Use English language, both written and spoken, competently andcorrectly.
2. CO 2: Improve comprehension and fluency ofspeech.
3. CO 3: Gain confidence in using English in verbalsituations.
4. CO 4: Hone the communication skills to meet the challenges of their careers verysuccessfully.
5. CO 5: Strengthen communication skills in different contexts like formal andinformal.
6. CO 6: Develop knowledge of different fields and serve the societyaccordingly

.

Unit–I: Part-A: Human Resources

Part-B: Ideal Family

Unit–II: Part-A: InLondon

Part-B: Verger

Unit-III: Part-A: Our LivingEnvironment

Part-B: Three Days to See

Unit-IV: Part A: Energy: Alternative Sources

Part-B:War

Unit-V: Part-A: Principles of Good Writing

Part-B: LetterWriting

Text/ Reference Books:

1. English for Engineers and Technologists, OrientBlackswan
2. Prose for Communication, Ravindra PublishingHouse
3. Panorama, Oxford UniversityPress

LINEAR ALGEBRA & DIFFERENTIAL CALCULUS

I SEMESTER

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: -

Course Outcomes:

- Apply the knowledge to solve a system of homogeneous and non-homogeneous linearequations
- Illustrate the methods of computing eigen values and eigenvectors
- Able to analyze the real life situations, formulate the differential equations then applythe solving methods
- Explain the techniques of solving the linear differential equations
- Optimize functions of several variables and able to find extreme values of constrained functions

Unit- I: Linear systems of equations, Eigen values & Eigen vectors

Part-A: Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations.

Part-B: Gauss -Jordan method, LU decomposition method, **Application:** Finding the current in electrical circuits, Eigen values, Eigen vectors, Properties of Eigen values (without proofs).

Unit-II: Quadratic forms & Differential calculus:

Part-A: Cayley-Hamilton theorem(without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor's and Maclaurin's series.

Part-B: Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor's theorem for functions of two variables. **Applications:** Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Unit-III: Differential equations of first order:

Part-A: Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli's equation, Exact differential equations.

Part-B: Equations reducible to exact equations, **Applications:** Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth.

Unit-IV: Differential equations higher order:

Part –A: Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x).

Part-B: Rules to find the particular integral(RHS term of the type e^{ax} V(x), any other function), Method of variation of parameters. **Application:** L-C-R circuits.

Unit-V: Laplace Transforms (all properties without proofs):

Part-A: Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t.

Part-B: Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text/Reference Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition,2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition,2007.
3. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
4. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10thEdition, 2015.

ENGINEERING CHEMISTRY

I SEMESTER

Lecture: 3 Practical: 0 Internal Marks:30

Credits: 3 Tutorial: 0 External Marks: 70

Prerequisites: -

Unit-I: POLYMERS AND PLASTICS

PART-A Introduction- Degree of polymerization-functionality-tacticity-stereospecific polymers Types- Addition polymerization-Definition-PVC-Properties-applications Condensation polymerization- Bakelite-Properties-applications-differences between addition and condensation polymerization- Physical and mechanical properties of polymers-Thermoplastics and Thermosetting plastics

PART-B Conducting polymers– Biodegradable polymers-applications– Natural rubber-Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol- Composite materials & Fiber reinforced plastics

Unit-II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

PART-A Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes)

Primary cells: Zinc – air cell

Secondary cells:- Lithium ion batteries, Pb-acid cell,

Fuel cells:- H_2-O_2 fuel cell and molten carbonate fuel cells

PART-B Corrosion:- Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating -Electroless plating

Unit-III: WATERTECHNOLOGY

PART-A Hard water:- Reasons for hardness – units of hardness Boiler troubles – Priming and Foaming, Sludge and Scale formation, Boiler corrosion, Caustic embrittlement Softening of water : Zeolite process- Ion Exchangeprocess

PART-B Effluent treatment(biological , aerobic and anaerobic methods) Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination Desalination of brackish water– Reverse Osmosis and Electro Dialysis

Unit-IV: FUELS

Part-A Fuels:- Introduction – Classification – Characteristics of a good fuel-Calorific value - HCV and LCV – Dulong's formula – Bomb calorimeter – Numerical problems

Solid Fuels —Coal — Proximate and ultimate analysis –Significance of the analyses

PART-B Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents –Power alcohol – Bio-diesel

Gaseous fuels – Natural gas – LPG and CNG

Unit-V: CHEMISTRY OF MATERIALS AND ANALYTICAL TECHNIQUES

PART-A Lubricants: - Definition, function, Theory and mechanism of lubricants, properties (Definition and importance)-viscosity, flash and fire point, aniline point, cloud and pour point

Nano Materials*:* -Introduction –General methods of preparation (top down and bottom up) - Applications

Green Synthesis: - Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources(microwave method) -R4M4 principles-Econoburette.

PART-B UV Spectroscopy- Basic Principle-Instrumentation- Applications IR Spectroscopy-Basic principle-Instrumentation- Applications NMR Spectroscopy- Basic principle- Instrumentation-Applications Analytical techniques: FE-SEM, TEM, BET

Chromatography techniques: Paper chromatography, Thin layer chromatography- applications

Text/ Reference Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai PublicatingCo.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015edition.
3. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition(second).
4. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015edition.
5. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., LatestEdition
6. Applied Chemistry by H.D. Gesser, SpringerPublishers
7. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press,IIM

PROBLEM SOLVING THROUGH C

I SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes: The student will learn

1. To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
2. To implement conditional branching, iteration and recursion.
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To use structures and files

Unit-I:

Part-A: INTRODUCTION TO COMPUTERS

Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process.

Part-B: BASICS OF C PROGRAMMING:

Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements.

Unit-II:

Part-A: Decision making statements: if, if else, nester if. Muti way decision making statements: else if, Switch statement

Part-B: Looping statements: while, do while, for, Compilation process

Unit-III:

Part-A: Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, Two dimensional arrays, Matrix Operations, Multi-dimensional Arrays

Part-B: Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

Unit-IV:

Part-A: FUNCTIONS

Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion, Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

Part-B: POINTERS

Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation.

Unit-V:

Part-A: STRUCTURES AND UNIONS

Structure , Nested structures , Pointer and Structures , Array of structures , Example Program using structures and pointers , Self referential structures, Unions.

Part-B: FILE PROCESSING

Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command linearguments

Text/ Reference Books:

1. Reema Thareja, “Programming in C”, Oxford University Press, Second Edition,2016.
2. Krnighan. B.W and Ritche, D.M, “The C Programming Language”, Second Edition, Pearson Education,2006
3. Pradep dey, Manas Ghosh, “Fundamentals of Computing and programming in C”, First Edition, Oxford University Press,2009.
4. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh Edition, PearsonPublication.
5. E Balagursamy, “Programming in C, Sixth Edition, Tata McGrawHill.
6. Ajay Mittal, “Programming in C A practical Approach”, Pearsoneducation

ENGINEERING MECHANICS

I SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Unit – I: Introduction to Engg. Mechanics – Basic Concepts.

Part-A: Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Part-B: Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition ofequilibrium.

Unit – II:

Part-A: Friction: Introduction**,** limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction, Wedges.

Part-B: Analysis of plane trusses-Method of Joints, Method of Sections.

Unit – III:

Part-A: Centroid: Centroid of simple figures (from basic principles) – Centroid of Composite Figures.

Part-B: Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappus theorems.

Unit-IV:

Part-A: Area moment of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Part-B: Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

Unit – V:

Part-A: Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion. **Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation– Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

Part-B: Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

Text/ Reference Books:

1. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hillpublications.
2. Engg. Mechanics- S S Bhavikati –New Age International Publishers
3. Engineering Mechanics, statics and dynamics – I.H.Shames, – PearsonPubl.
4. Engineering Mechanics, Fedinand . L. Singer, Harper – Collins.
5. Engineering Mechanics statics and dynamics , A Nelson , Mc Graw Hillpublications
6. Engg. Mechanics- A KTayal
7. Engieering Mechanics , R.K.Bansal, LaxmiPublications
8. Engg. Mechanics- KL Kumar-Tata McGraw Hillpublications

ENGLISH COMMUNICATION SKILLS LAB-I

I SEMESTER

Lecture: 0	Practical: 2	Internal Marks:40
Credits: 1	Tutorial: 0	External Marks: 60

Prerequisites: -

Course Outcomes:

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1. Greetings andIntroduction
2. Request Permission & GivingDirections
3. Inviting/Complaining/Congratulating
4. Root Words
5. Phonetics-Sounds andSymbols
6. PronunciationRules

Text/ Reference Books:

1. ***Strengthen Your Steps,*** MarutiPublications

2. ***Interact,*** Orient Blackswan

3. ***Word Power Made Easy***, PocketBooks

ENGINEERING CHEMISTRY LABORATORY

I SEMESTER

Lecture:0 Practical: 3 Internal Marks: 40

Credits: 1.5 Tutorial:0 External Marks:60

Prerequisites: -

Applied /Engineering chemistry laboratory

S.No	Name of the Experiment
1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na2CO3 and
4	Determination of temporary and permanent hardness of water using
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

PROGRAMMING FOR PROBLEM SOLVING LAB

I SEMESTER

Lecture:0 Practical:3 Internal Marks:40

Credits: 1.5 Tutorial:0 External Marks:60

Prerequisites: -

1. Write a C program to convert temperature from Fahrenheit to Celsius.

   Write a C program to find the roots of a quadratic equation.

   Write a program to implement simple calculator using switch case
2. Write a C program to determine if the given number is a prime number or not.

   Write a program to display the factorial of a given number
3. Write a program to display whether a given is Armstrong or not

   Write a C program to generate the first n terms of the Fibonacci sequence.
4. Write a C program to display the reverse of a given number.

   Write a C program to calculate the following sin and cos value
5. Write a program for sorting numbers in a list.
6. Write programs for searching a number in the list using
   a. Linear search
   b. Binary search
7. Write programs that reads two matrices to perform the following:
   i. Addition of two matrices
   ii. Multiplication of two matrices
8. Write a program to perform the following operations without using build in string operations:
   i. To display the length of the string.
   ii. To check whether the string is palindrome or not
   iii. To delete n characters from a given position in a given string.
9. Write a program to generate GCD of two numbers using functions
10. Write a C program that reads two integers n and r to compute the ncr value using the following relation: $n_{cr}(n, r) = n! / r! (n,r)!$. Use a function for computing the factorial value of an integer.

11. Write programs for the following using recursive functions
    a. Factorial of a given number
    b. GCD of two numbers
    c. Fibonacci series
12. Write a program to demonstrate call by value and call by reference.
13. Write a program to perform following operating using pointers
        i. Reverse of a string
        ii. Comparison of two strings
14. Write a program for displaying the details of the student by sorting themaccording to the marks using structure containing roll no, name and marks.
15. Write a program for merging two files
16. Write a program to count no of lines, words, characters in a file
17. C Program to Create Employee File Name Record that is taken from the Command Line Argument

ENVIRONMENTAL STUDIES

I SEMESTER

Lecture: 2	Practical: 0	Internal Marks:30
Credits: 0	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes:

CO1 The importance of environment, Natural resources and current global environmental challenges
CO2 The concepts of the ecosystem and its function in the environment
CO3 The biodiversity of India and the threats to biodiversity, and conservation practices to protect
CO4 The various attributes of the pollution and their impacts and measures to reduce or control
CO5 The environmental legislations of India and Social issues and the possible means to
CO6 Environmental assessment and the stages involved in EIA.

Unit-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of Environmental Studies- Importance of Environmental Studies- Need for public awareness, Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference, Earth summit

Unit-II: ECOSYSTEM

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest Ecosystem-Grassland ecosystem ,Desert ecosystem- Aquatic ecosystem: pond ,lake ecosystem- Streams ,river ecosystem, Oceans

Unit-III: NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources- Forest resources**:** Use and over-exploitation - Deforestation-Timber extraction-Mining- Conservation- Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management- Energy resources**:** renewable energy sources –solar-wind- hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

Unit-IV: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity- Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India- Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

Unit-V: ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects,control measures- Pollution case studies- Role of an individual in prevention of pollution

Unit-VI: ENVIRONMENTAL LEGISLATION & MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of Environmental Management Plan and Environmental Impact Statement- Ecotourism

Text/ Reference Books:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, NewDelhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai
5. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
6. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
7. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
8. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

II

SEMESTER

SYLLABUS

ENGLISH-II

II **SEMESTER**

Lecture:1	Practical:2	Internal Marks:30
Credits: 2	Tutorial:0	External Marks:70

Prerequisites: -

Unit-I: a) Transport: Problems andSolutions

b) The Scarecrow

Unit-II: a) TheDrunkard

b) A Village Lost to the Nation

Unit-III: a) EvaluatingTechnology

b) The Knowledge Society

Unit-IV: a) Industry: Safety andTraining

b) Martin Luther King and Africa

Unit-V: a) Man's Peril(Detailed)

b) Report Writing

Text/ Reference Books:

1. English for Engineers and Technologists, OrientBlackswan
2. Prose for Communication, Ravindra PublishingHouse
3. Panorama, Oxford UniversityPress

ENGLISH COMMUNICATION SKILLS LAB-II

II SEMESTER

Lecture:	Practical:	Internal Marks: 40
Credits:	Tutorial:	External Marks: 60

1	a.	Introducing Yourself and Other People
		Employability Skills
	b.	Introduction to Soft Skills
		My Skills, My Strengths
2	a.	Discussing Daily Routines
		Free Time Activities
	b.	Describing Family
		Talking about Family
3	a.	Giving Directions
		Ordering Food
	b.	Asking for and Paying the Bill
		Describing Appearances and Personality
4	a.	Writing a Product Description-1
	b.	Writing a Product Description-2
5	a.	Describing an Advertised Job
		Skills Needed for Different Jobs
	b.	What Kind of Job Are You Interested in?
		Finding out about a Job
6	a.	Managing Nerves in a Presentation
	b.	Learning about Presentations

Text/ Reference Books:

Online Resources:

https://goo.gl/v57WHe

http://www.careerbuilder.co.inhttps://goo.gl/

w3FweChttps://goo.gl/4GoueJetc.

VECTOR CALCULUS & FOURIER TRANSFORMS

II SEMESTER

Lecture: 3 Practical:0 Internal Marks: 30

Credits: 3 Tutorial:0 External Marks:70

Unit-I: Special functions & Multiple integrals:

Part-A: Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Part-B: Multiple Integrals: Double integrals in Cartesian & polar coordinates, change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

Unit-II: Vector Calculus:

Part-A: Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div& Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Part-B: Vector Integration: Line integral, Green's theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

Unit-III: Fourier Series:

Part-A: Euler's formulae(without proof), Conditions of a Fourier expansion, Functions having points of discontinuity.

Part-B: Change of interval, Even and odd functions, Half-range series.

Unit-IV: Fourier Transforms:

Part-A: Fourier Integral, Fourier cosine & sine integral, complex forms of Fourier integral.

Part-B: Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms(without proof), Convolution theorem(without proof), finite Fourier sine & cosine transforms.

Unit-V: Applications of Partial Differential Equations:

Part-A: Definition of PDE, Classification of 2nd order PDE, Variable separable method, Vibrations of a stretched string – Wave equation.

Part-B: One-dimensional heat flow, Two-dimensional heat flow, Solution of Laplace's equation.

Text/ Reference Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition,2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition,2007.
3. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition,2014.
4. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition,2015.

ENGINEERING PHYSICS

IISEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes:

CO1: To identify different crystal structures and to study different point defects.

CO2: To gain basic knowledge of Simple harmonic waves and study of free and forced vibrations.

CO3: To Develop the knowledge of science of Acoustics and Ultrasonics and their applications in various fields.

CO4: The Analytical study of response of materials to Electromagnetic fields.

CO5: The Study of lasers and optical fibers with an emphasis of their Engineering applications.

Unit–I:

Part-A: CRYSTAL STRUCTURE

Lattice, Basis and Unit cell – Lattice parameters – Bravais Lattices – Crystal Systems – Coordination number –SC, BCC, FCC – Packing Fraction.

Part-B: Miller Indices – Crystal Planes – Inter planar distance – X-ray Diffraction – Bragg's Law- Imperfections in Crystals – Point defects

Unit–II: WAVES & OSCILLATIONS

Part-A: Characteristics of sound waves – Simple harmonic motion-Displacement-Amplitude- Time period – Frequency-Phase-Wavelength-Equation for SHM.

Part-B: Free Vibrations-Damped vibrations- Forced vibrations –Resonance.

Unit–III:

Part-A: ACOUSTICS

Reverberation time -Sound Absorption, Absorption Coefficients and its measurement – Sabine's Formula – Basic Requirements of Acoustically good hall – Factors affecting architectural Acoustics and their remedies.

Part-B: ULTRASONICS

Production – Ultrasonic transducers – Non Destructive Testing(NDT) – Pulse Echo Technique - Different types of Scans – Applications.

Unit–IV:

Part-A: INTRODUCTION TO ELECTROMAGNETIC THEORY

Grad – Div – Curl – Gauss and Stoke's theorems – Fundamental Laws of Electromagnetism.

Part-B: Maxwell's Equations – Poynting vector- Propagation of Electromagnetic waves in a dielectric medium.

Unit–V:

Part-A: LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Applications.

Part-B: OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Engineering Applications(Buildings , Bridges, Pavements and Sensors).

Text/ Reference Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications
2. Engineering Physics by M.Avadhanuluand P.G. Kshirasagar – S Chand Publications (10^{th}Edition)
3. Applied Physics by S.O.Pillai – New Age Publications – (3^{rd}Edition)
4. Introduction to Solid State Physics by Charles Kittel, Wiley India PvtLtd.
5. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014Edition)
6. Engineering Physics by M.Armugam – Anuradha Publications
7. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications.
8. Engineering Physics by V.Rajendran (2010 Edition) Mc Graw Hill Publications.

BIOLOGY FOR ENGINEERS

II SEMESTER

Lecture:2	Practical:0	Internal Marks: 30
Credits: 2	Tutorial:0	External Marks: 70

Course Outcomes:

After studying the course, the student will be able to:

CO1: Understand how biological observations lead to major discoveries and the morphological, Biochemical and ecological classification of organisms.

CO2: Understand that all forms of life have the same building blocks and their involvement in the Maintenance and metabolic processes of living organisms.

CO3: Classify enzymes and distinguish between different mechanisms of enzyme action and Study the chemical reactions that are catalyzed by enzymes. Apply thermodynamic Principles to biological systems and able to understand major chemical processes that occur Within a living organism in order to maintain life.

CO4: Identify DNA as a genetic material in the molecular basis of information transfer.

CO5: Identify and classify microorganisms, understand media compositions and growth of Microorganisms

Unit-I*:* Introduction

Part-A: Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry.

Part-B: Classification of organisms based on (a) Cellularity- Unicellular or Multicellular, (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial

(f) Molecular taxonomy- three major kingdoms of life.

Unit-II: Biomolecules

Part-A: Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function.

Part-B: Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

Unit-III: Enzymes & Metabolism

Part-A: Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters.

Part-B: Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

Unit-IV: Information Transfer

Part-A: Concept of genetic code.

Part-B: Molecular basis of information transfer; Transcription and translation.

Unit-V: Microbiology

Part-A: Concept of species and strains, Identification of Micro organisms.

Part-B: Sterilization and media compositions, Growth kinetics.

Text/ Reference Books:

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson EducationLtd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBSPublisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. BrownPublishers

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

II SEMESTER

Lecture: 3 Practical: 0 Internal Marks:30

Credits: 3 Tutorial: 0 External Marks: 70

Unit – I: Electric Circuits

Part-A: Basic definitions, Types of network elements & sources, Ohms law, Kirchhoff's laws, Series & parallel circuits.

Part-B: Source transformation, Network reduction reductions, Introduction to AC circuits.

Unit – II: Electrical Machines

Part-A: Basic laws – Faraday's laws of electromagnetic induction, Lenz's law, Right hand thumb rule, Fleming's left hand and right hand rules, Construction, working principle and applications of DCmachines**.**

Part-B: Construction, working principle and applications of transformers, induction motor and synchronous machines.

Unit – III: Electrical Power Generation, Transmission and Distribution

Part-A: Sources of Energy – conventional & non conventional, Introduction and layout of thermal, hydel power plants**.**

Part-B: Introduction and layout of nuclear power plants, solar power plants, Concepts of power transmission and distribution using single line diagram.

Unit – IV: Electrical Installations & Safety

Part-A: Components of Switchgear – fuse, MCBs, types of wires & cables, earthing, different types of batteries, Elementary calculations for energy consumption and types of tariffs.

Part-B: Energy Conservation. Electric shock and first aid, Hazardous areas, General principles of electricsafety.

Unit – V: Basic Electronic Devices and their applications

Part-A: Introduction to semi-conductor physics, PN junction diode, Zener diode, Transistor - operation, characteristics and configurations, Operation of transistor as a switch.

Part-B: Half wave, full wave and bridge rectifier using diodes, types of filters, Zener diode as a voltage regulator, transistor as an amplifier. introduction to feed back amplifiers.

Text/ Reference Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.

2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill,2009.

3. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGrawHill,

ENGINEERING DRAWING

II SEMESTER

Lecture:3	Practical:0	Internal Marks: 30
Credits: 4	Tutorial:1	External Marks:70

Prerequisites: -

Course Outcomes:

CO1: Draw the polygons, ellipse, parabola, hyperbola, cycloids and involutes for various types of profiles.

CO2: Construction of various scales like plain, diagonal and venier scales. Draw the orthographic projections of the points, lines.

CO3: Draw the projections of planes.

CO4: Draw the projections of solids

CO5: Convert Orthographic projections to isometric projection and vice versa.

Unit-I:

Part-A: Lettering, Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods.

Part-B: Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes- Tangent and Normal to the above curves.

Unit-II:

Part-A: Orthographic projections: Introduction, Projections of points. Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane.

Part-B: Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

Unit-III:

Part-A: Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane;

Part-B: Projections of planes inclined to both the reference planes.

Unit-IV:

Part-A: Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Part-B: Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

Unit-V:

Part-A: Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views.

Part-B: Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text/ Reference Books:

1. Engineering Drawing, N. D. Butt, ChariotPublications
2. Engineering Drawing +Auto CAD, K Venugopal &V Prabhuraja, Newage Publishers.
3. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
4. Engineering Graphics for Degree, K. C. John, PHIPublishers
5. Engineering Drawing, Agarwal & Agarwal, Tata McGraw HillPublishers
6. Engineering Graphics, P.I. Varghese, McGraw HillPublishers

ENGINEERING PHYSICS LAB

(Any 10 of the following listed experiments)

IISEMESTER

Lecture:0 Practical:3 Internal Marks: 40

Credits: 1.5Tutorial:0 External Marks:60

Prerequisites: -

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano – Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings -Sonometer
9. Determination of Young's modulus by method of single cantilever oscillations.
10. Melde's experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p – n junction.

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

II **SEMESTER**

Lecture: 0	Practical: 2	Internal Marks:30
Credits: 1	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes:

- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines and Power Converters.
- To introduce components of Low Voltage Electrical Installations

List of Experiments:

1. Study of different switches, MCBs, measuring instruments, wires and cables.
2. Identification and measurement of resistance, inductance &capacitance.
3. Practice house wiring with MCB, 3 pin sockets, 2-way control of lamp.
4. Load test on DC shunt motor
5. Load test on DC shunt Generator
6. Constructional study of machine and engine parts using their cut sections.
7. Identification and testing of different electronic devices like diode, BJT, FET, SCR, IGBT, MOSFET, UJT etc.,
8. Practice soldering with simple electronic components on PCB.
9. V-I Characteristics of PN junction diode
10. Characteristics of Bipolar Junction Transistor

BASIC ENGINEERING & IT WORKSHOP

II SEMESTER

Lecture:0 Practical:3 Internal Marks:40

Credits: 1.5 Tutorial:0 External Marks:60

Prerequisites: -

Engineering Workshop:

1. Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

2. Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

3. Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

4. Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop 4. Funnel

IT Workshop

1. Identification of computer peripherals, installation of OS andtroubleshooting.
2. Orientation and practice on MSWord.
3. Orientation and practice on MSExcel.
4. Orientation and practice on MS PowerPoint.
5. LAN & Wi-Fi Network connectivity using TCP/IP settings and customization of web browsers.
6. Introduction to HTML and design of basic webpage.

III

SEMESTER

SYLLABUS

HUMANITIES (EFFECTIVE TECHNICAL COMMUNICATION)

III **SEMESTER**

Lecture:3	Tutorial:0	Internal Marks	30
Credits:3		External Marks	70

Course Objectives

- The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

UNIT I. Vocabulary Building

The concept of Word Formation**,** Root words from foreign languages and their use in English**,** Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, and standard abbreviations.

UNIT II. Writing Skills

Sentence Structures**,** use of phrases and clauses in sentences**,** importance of proper punctuation**,** creating coherence**,** organizing principles of paragraphs in documents**,** Techniques for writing precisely**,** Comprehension**,** Essay writing

UNIT III. Identifying Common Errors in Writing

Subject-verb agreement**,** Noun-pronoun agreement**,** Misplaced modifiers**,** Articles**,** Prepositions**,** Redundancies**,** Clichés, Creative Writing Skills

UNIT IV. Oral Communication

Common Everyday Situations: Conversations and Dialogues**,** Communication at Workplace**,** Interviews**,** Formal Presentations

UNIT V. Life Skills

Self-assessment and self-esteem**,** Attitudes, Values and belief**,** Personal goal setting**,** career planning, Managing Time**,** Complex problem solving**,** Creativity

Text Books/Reference Books:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book.2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press.2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

NUMERICAL METHODS & PROBABILITY STATISTICS

III SEMESTER

Lecture:3	Tutorial:0	Internal Marks	: 30
Credits: 3		External Marks	: 70

Course Objectives

- To understand the various numerical techniques.
- To introduce the concepts of probability and statistics.
- To know the importance of the correlation coefficient & lines of regression
- To know sampling theory and principles of hypothesis testing.

UNIT I:

Numerical Solution of Equations: Solution of Algebraic and transcendental equations: Bisection method, Method of false position and Newton-Raphson method (one variable and non-linear simultaneous equations). Iterative methods of solution of linear simultaneous equations: Jacobi's and Gauss-Seidel iteration methods.

UNIT II:

Numerical Integration & Numerical Solution of ODE: Numerical Integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rules. Numerical Solution of ODE: Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge Kutta method of 4^{th} order.

UNIT III:

Continuous Random variable and distributions: Introduction-Continuous Random Variable-Distribution function- Expectation-Moment Generating Function-Moments and properties. Continuous distribution: Normal distributions, Normal approximation to Binomial distribution.

UNIT IV:

Sampling Theory: Introduction - Population and samples- Sampling distribution of means (s known)-Central limit theorem- t-distribution- Sampling distribution of means (s unknown)- Sampling distribution of variances -$\square^2$and F-distributions- Point estimation- Maximum error of estimate - Interval estimation.

UNIT V:

Tests of Hypothesis: Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means- Proportions and their differences.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43^{rd}Edition,2014.
2. Richards A Johnson, Irvin Miller and Johnson E Freund. Probability and Statistics for Engineering, 9thEdition,PHI.
3. C. S. Desai Finite ElementMethods.

Reference Books:

1. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9^{th} Edition,2014.
2. Jay l.devore, Probability and Statistics for Engineering and the Sciences,8^{th}edition,Cengage.

LIFE SCIENCE

III SEMESTER

Lecture:2	Tutorial:0	Internal Marks	30
Credits:2		External Marks	70

Unit-I:

Plant Physiology covering, Transpiration; Mineral nutrition; Ecology covering, Ecosystems- Components, types, flow of matter and energy in an ecosystem; Community ecology- Characteristics, frequency, life forms, and biological spectrum;

Unit-II

Population Dynamics covering, Population ecology- Population characteristics, ecotypes; Population genetics- Concept of gene pool and genetic diversity in populations, polymorphism and heterogeneity

Unit-III

Environmental Management covering, Principles: Perspectives, concerns and management strategies; Policies and legal aspects- Environment Protection Acts and modification, International Treaties; Environmental Impact Assessment- Case studies (International Airport, thermal power plant);

Unit-IV

Molecular Genetics covering, Structures of DNA and RNA; Concept of Gene, Gene regulation, e.g., Operon concept; Biotechnology covering, Basic concepts: Totipotency and Cell manipulation; Plant & Animal tissue culture- Methods and uses in agriculture, medicine and health; Recombinant DNA Technology- Techniques and applications;

Unit V:

Biostatistics covering, Introduction to Biostatistics, Terms used, types of data; Measures of Central Tendencies- Mean, Median, Mode, Normal and Skewed distributions; Analysis of Data- Hypothesis testing and ANNOVA (single factor)

Text/Reference Books:

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.;Wasserman,
   S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown z Publishers

PROFESSIONAL ELECTIVE- I:

(A).BUILDING MATERIALS AND CONSTRUCTION

III SEMESTER

Lecture: 2	Practical: 0	Internal Marks	: 30
Credits: 2		External Marks	: 70

Course Objectives

- To learn about the nature, properties, classification and manufacturing process ofbuilding materials and familiarize with various methods of masonry construction.
- To understand the knowledge of building components, finishings.

UNIT I:

Stones, Bricks and Tiles: Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile – manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials – their quality.

UNIT II

Masonry Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

Wood: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiver – Reinforced Plastics, Steel, Aluminium.

UNIT III:

Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime.

Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement, various types of cement and their properties, various field and laboratory tests for Cement.various ingredients of cement concrete and their importance – various tests for concrete.

UNIT IV:

Building Components Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre-fabricated roofs.

UNIT V:

Finishings: Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering – Paints: Constituents of a paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings.

Aggegates: Classification of aggregate – Coarse and fine aggregates- particle shape and texture
– Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

TEXT BOOKS:

1. Building Materials by S.S. Bhavikatti, Vices publications House private ltd.
2. Building Construction by S.S. Bhavikatti, Vices publications House private ltd.
3. Building Materials by B.C. Punmia, Laxmi Publications private ltd.
4. Building Construction by B.C. Punmia, Laxmi Publications (p)ltd.

References

1. Building Materials by S.K.Duggal, New Age International Publications.
2. Building Materials by P.C.Verghese, PHI learning (P)ltd.
3. Building Materials by M.L.Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Building construction by P.C.Verghese, PHI Learning (P)Ltd.

(B).RURAL WATER SUPPLY AND ONSITESANITATION

III SEMESTER

Lecture: 2	Practical: 0	Internal Marks	: 30
Credits: 2		External Marks	: 70

UNIT I

Concept of environmental and scope of sanitation in rural areas. Magnitude of problem of water supply and sanitation – population to be covered and difficulties National policy. Various approaches for planning of water supply systems in rural areas. Selection and development of preferred sources of water, springs, wells and infiltration galleries, collection of raw water from surface source.

UNIT II

Specific problem in rural water supply and treatment e.g. iron, manganese, fluorides etc. Low cost treatment , appropriate technology for water supply and sanitation. Improvised method and compact system of treatment of surface and ground waters such as MB settlers, slow and sand filter, chlorine diffusion cartridge etc. Water supply through spot sources, hand pumps, open dug – well.

UNIT III

Planning of distribution system in rural areas. Water supply during fairs, festivals and emergencies. Treatment and disposal of wastewater/sewage. various method of collection and disposal of nightsoil.

UNIT IV

On site sanitation system and community latrines. Simple wastewater treatment system for rural areas and small communities such as stabilization ponds, septic tanks, soakage pits etc.

UNIT V

Disposal of solids waste: composting, land filling. Biogas plants.

TEXT/REFERENCE BOOKS:

1. Low-cost on-site sanitation option, Hoffman & Heijno Occasional Nov.1981 paper No 21, P.O. Box 5500 2280 HM Rijswijk, the Netherlands offices, J.C.Mokeniaan,
2. Rijswijk (the Haque). Wagner, E.G. and Lanoik, J.N. water supply for rural areas and small communities, Geneva: W.H.O.1959.
3. Manual of water supply and treatment, 3rd edition, CPHEEO, GOI, Newdelhi.

(C).INFRASTRUCTURE PLANNING ANDMANAGEMENT

III SEMESTER

Lecture: 2	Practical: 0	Internal Marks	: 30
Credits: 2		External Marks	: 70

UNIT I

An overview of Basic Concepts Related to Infrastructure: Introduction to Infrastructure, an overview of the Power Sector in India., an Overview of the Water Supply and Sanitation Sector in India., an overview of the Road, Rail, Air and Port Transportation Sectors in India., an overview of the Telecommunications Sector in India. , an overview of the Urban Infrastructure in India, an overview of the Rural Infrastructure in India, an Introduction to Special Economic Zones, Organizations and Players in the field of Infrastructure, The Stages of an Infrastructure Project Lifecycle., an overview of Infrastructure ProjectFinance

UNIT II:

Private Involvement in Infrastructure: A Historical Overview of Infrastructure Privatization. The Benefits of Infrastructure Privatization, Problems with Infrastructure Privatization, Challenges in Privatization of Water Supply: A Case Study, Challenges in Privatization of Power: Case Study, Privatization of Infrastructure in India: Case Study, Privatization of Road Transportation Infrastructure inIndia.

UNIT III:

Challenges to Successful Infrastructure Planning and Implementation: Mapping and Facing the Landscape of Risks in Infrastructure Projects, Economic and Demand Risks: The Case study for Political Risks, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure, Challenges in Construction and Maintenance of Infrastructure.

UNIT IV:

Strategies for Successful Infrastructure Project Implementation: Risk Management Framework for Infrastructure Projects, Shaping the Planning Phase of Infrastructure Projects to mitigate risks, Designing Sustainable Contracts, Introduction to Fair Process and Negotiation, Negotiating with multiple Stakeholders on Infrastructure Projects, Sustainable Development of Infrastructure, Information Technology and Systems for Successful Infrastructure Management

UNIT V:

Innovative Design and Maintenance of Infrastructure Facilities, Infrastructure Modeling and Life Cycle Analysis Techniques, Capacity Building and Improving the Governments Role in Infrastructure Implementation, An Integrated Framework for Successful Infrastructure Planning and Management - Infrastructure Management Systems and Future Directions.

Text/ Reference Books:

1. Grigg, Neil, Infrastructure engineering and management, Wiley, (1988).
2. Haas, Hudson, Zaniewski, Modern Pavement Management, Krieger, Malabar, (1994).
3. Hudson, Haas, Uddin, Infrastructure management: integrating design, construction, maintenance, rehabilitation, and renovation, McGraw Hill, (1997).

(D).ARCHITECTURE AND TOWN PLANNING

III SEMESTER

Lecture: 2	Practical: 0	Internal Marks	: 30
Credits: 2		External Marks	: 70

UNIT I

History of Architecture: Western Architecture: Egyptian, Greek, Roman Architectures-Orders. Indian Architecture: Vedic age, Indus valley civilization– Buddhist period: Stambas, Stupa, Toranas, Chaityas, Viharas – Hindu temples: Dravidian and Indo Aryan Styles-Temple of Aihole, Madurai, Bhuvaneshwar, Mount Abu. Indo Sarsanic (Islamic) Architecture: Mosque - Palace - Fort - Tomb.

UNIT II

Architectural Design: Principles of designing – Composition of Plan – relationship between plan and elevation- building elements, form, surface texture, mass, line, color, tone- Principles of Composition: Unity, contrast, proportion, scale, balance, circulation, rhythm, character, expression.

UNIT III

Principles of Planning: Principles of planning a residence- site selection, site orientation-aspect, prospect, grouping, circulation, privacy, furniture requirements, services and otherfactors.

Post-classic Architecture: Introduction of post-classic architecture contribution of eminent architects to modern period-Edward Lutyens, Le Corbusier, Frank Lloyd Wrigt, Walter Groping.

UNIT IV

Histroical Back Ground of Town Planning: Town planning in India – Town plans of mythological Manasa-Town plans of ancient towns: Harappa, Mohenjodaro, Pataliputra, Delhi, Acropolis (Greece), Jerusalem, Mecca, Rome, London.

UNIT V

Modern Town Planning: Zoning- Roads and road traffic- Housing- Slums, Parks, Play grounds- Public Utility Services- Surveys and maps for planning- neighbourhoodPlanning.

Standards of Town planning: Planning new towns, planning standards and specifications, national and regional planning, town planning and legislation planning regulations and limitations.

TEXTBOOKS:

1. 'The great ages of World Architecture' by G.K.Hiraskar.
2. 'Planning and Design of Buildings by Section of Architecture' by Y. S.Sane.
3. 'Professional Practice' by G.K.Krishnamurthy, S.V.Ravindra, PHI Learning, NewDelhi.
4. 'Indian Architecture – Vol. I & II' by Percy Brown, Taraporevala Publications,Bombay.
5. 'Fundamentals of Town Planning'by G.K.Haraskar.

REFERENCES:

1. 'Drafting and Design for Architecture' by Hepler, Cengage Learning 'Architect's Portable Handbook' by John Patten Guthrie – Mc Graw Hill International Publications.
3. 'Mordern Ideal Homes for India' by R. S.Deshpande.
4. 'Town and County Planning'by A.J.Brown andH.M.Sherrard.
5. 'Town Design'by Federik Glbbard, Architectural press,London.

STRENGTH OF MATERIALS - I

III SEMESTER

Lecture: 2	Tutorial: 2	Internal Marks	: 30
Credits: 3		External Marks	: 70

Course Objective:

- To provide basic knowledge by understanding the fundamental concepts of mechanics of deformable solids
- Including simple stresses and strains, principal stresses and strains, strain energy, shear force, bending moments and geometry of deformation.

UNIT I:

Simple Stresses and Strains, Strain Energy, Simple Stresses and Strains: Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Poisson's ratio and volumetric strain – relationship between Elastic constants – Bars of varying section
– composite bars – Temperature stresses – Self weight. Strain Energy: Resilience – Gradual, sudden and impact loadings – simple applications. Principal Stresses and Strains, Mohr's circle of stress.

UNIT II:

Shear Force and Bending Moment (Determinant Beams) Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading.

UNIT III:

Theory of Simple Bending and Shear Stresses: A Theory of Simple Bending: Assumptions – Derivation - Neutral axis – Determination of bending stresses and section modulus of rectangular, circular sections (Solid and Hollow), I, T, Angle and Channel sections. Shear Stresses: Derivation– Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections (Examples on Shear Stress Distributions)

UNIT IV:

Deflection of Beams (Determinant Beams) bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam: Double Integration method, Macaulay's method, Area Moment method, Conjugate beam method.

UNIT V:

Thin Cylinders & Thick Cylinders, Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells. B: Thick Cylinders: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders –Necessary difference of radii for shrinkage – Thick spherical shells.

TEXTBOOKS:

1. Rajput.R.K. “Strength of Materials”, S.Chand and Co, New Delhi,2015.
2. Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, SMTS –I Strength of materials, Laxmi publications. New Delhi,2015
3. Rattan . S. S, “Strength of Materials”, Tata McGraw Hill Education Private Limited, New Delhi, 2012
4. Bansal. R.K. “Strength of Materials”, Laxmi Publications Pvt. Ltd., New Delhi,2010

REFERENCES:

1. Timoshenko.S.B. and Gere.J.M, “Mechanics of Materials”, Van Nos Reinbhold, New Delhi 1999.
2. Vazirani.V.N and Ratwani.M.M, “Analysis of Structures”, Vol I Khanna Publishers, New Delhi,1995.
3. Junnarkar.S.B. and Shah.H.J, “Mechanics of Structures”, Vol I, Charotar Publishing House, New Delhi2016.
4. Singh.D.K.,“StrengthofMaterials”,AneBooksPvt.Ltd.,NewDelhi,20165.Basavarajaiah, B.S. and Mahadevappa, P., Strength of Materials, Universities Press, Hyderabad, 2010.
5. Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 2009.

FLUID MECHANICS

III SEMESTER

Lecture:3	Tutorial:0	Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

- To explain concepts of fluid mechanics used in Civil Engineering.
- To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
- To enable the students measure quantities of fluid flowing in pipes, tanks and channels
- To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

UNIT -I:

Basic concepts and definitions: Distinction between a fluid and a solid; Density, Specific weight, Specific gravity Of Various solids and fluids, Kinematic and dynamic viscosity; Thermodynamic properties, variation of viscosity with temperature, Newton law of viscosity; vapor pressure, boiling point, cavitation, surface tension, capillarity, Bulk modulus of elasticity, compressibility.

UNIT -II:

Fluid statics: Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude, Pressure distribution in a static fluid. Piezometer, U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Gauge Pressure and absolute pressure. Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT -III:

Fluid kinematics: Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three - dimensional continuity equations in Cartesian coordinates. Reynold's Transport theorem

UNIT -IV:

Fluid Dynamics: Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle,Total energy line and hydraulic gradient line; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced;

UNIT -V:

Dimensional Analysis: Dimensional Analysis and Dynamic Similitude - Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number; Buckingham's π-Theorem

Analysis of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line in pipes; Pipes in series and parallel; Concept of equivalent length; Friction factor for pipe flow, Modies Diagram.

TEXT BOOKS:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi.
2. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House
3. Rajput, Fluid mechanics and fluid machines, S. Chand &Co
4. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw

REFERENCES:

1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition2009.
2. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press,2010.
3. K. Subramanya, Open Channel flow, Tata Mc.Grawhill Publishers.

SURVEYING

III SEMESTER

Lecture:3	Tutorial:0	Internal Marks	30
Credits:3		External Marks	70

Course Objectives

- Highlight the purpose of surveying in civil engineering construction,
- Explain different types of curves, their requirement and curve setting.
- Formulate survey observations and perform calculations
- Train on utilization of surveying instruments like EDM, Total station and GPS.
- Demonstrate basics of photogrammetric and mapping process.
- Throw light on remote sensing elements.
- Apply the knowledge, techniques, skills, and applicable tools of the discipline to Engineering and surveying activities

UNIT- I:

Introduction –primary divisions of surveying, classification of surveying, principles of surveying, basic measurements in surveying, plan and map- Brief about linear measurements and instruments-Errors in chaining.

Chain Surveying Principles of chain surveying, basic definitions, well-conditioned triangle, selection of survey stations and survey lines, recording measurements, offsets, cross staff survey, obstacles in chaining and ranging, chain traversing.

UNIT - II:

Compass Survey: Introduction, types of compass, prismatic compass, included angles, types of bearings, types of meridians, compass traverse, Magnetic declination, local attraction and corrections

Levelling and Contouring: Levelling principles, basic definitions, Parts of dumpy level, types of eye pieces, types of staves, temporary adjustments, methods of levelling, theory of differential levelling, profile levelling, reciprocal levelling, levelling problems, contouring, contour interval, characteristics of contours, direct and indirect methods of contouring, uses of contour maps.

UNIT-III

Trigonometric Leveling: Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods -triangulation -network- Signals. Baseline - choices - instruments and accessories - extension of base lines -corrections - Satellite station - reduction to centre - Inter-visibility of height and distances - Trigonometric leveling - Axis single corrections.

UNIT-IV

Curves - Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves

UNIT-V

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station – Parts of a Total Station – Accessories – Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS, Co- ordinate transformation, accuracy considerations.

Text/Reference Books:

1. Arora, K.R., Surveying, Vol-I, II and III, Standard BookHouse,
2. C. Venkatramaiah, Text Book of Surveying, Universities Press Pvt Ltd, Hyderabad. Revised Edition
3. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, PearsonIndia,

MANAGEMENT 1 (ORGANIZATIONAL BEHAVIOR)

III SEMESTER

Lecture: 2 Tutorial: 0	Internal Marks : 00
Credits: 0	External Marks : 00

Course Objectives:

- To understand the psychology of workers and other members in the organization.
- To be equipped with the right knowledge and skills regarding organizational processes, group behavior, organizational structure and culture.
- To build up strategies for development at their workplace.
- To motivate and control employees.
- To resolve organizational conflict effectively.

UNIT I

Fundamentals of OB: Evolution of management thought, functions of management, Definition, Scope and Importance of OB, Relationship between OB and the individual, Evolution of OB, Models of OB (Autocratic, Custodial, Supportive, Collegial & SOBC), Limitations of OB.

Unit II

Values, Attitudes and Emotions: Introduction, Values, Attitudes, Definition and Concept of Emotions, Emotional Intelligence - Fundamentals of Emotional Intelligence, The Emotional Competence Framework, Benefits of Emotional Intelligence, difference between EQ and IQ.
Stress at workplace: Work Stressors – Prevention and Management of stress – Balancing work and Life, Workplace spirituality.

Unit III

Personality & Attitude: Definition Personality, importance of personality in Performance, The Myers-Briggs Type Indicator and The Big Five personality model, Johari Window, Transaction Analysis, Definition Attitude Importance of attitude in an organization, Right Attitude, Components of attitude, Relationship between behavior and attitude.

Unit IV

Perception: Factors influencing perception, Selective perception, Attribution theory, Perceptual process, Social perception (stereotyping and halo effect).
Motivation: Definition & Concept of Motive & Motivation, Theories of Motivation (Maslow's Need Hierarchy & Herzberg's Two Factor model Theory)
Group and Team Dynamics: Meaning Group Dynamics, Types of Groups, Group Development, Team Effectiveness & Team Building.

Unit V

Organizational Culture: Types of Culture, Creating and Maintaining Organization Culture, Managing Cultural Diversity.

Organizational Change: Types of Organizational change, Forces that acts as stimulants to change, overcome the Resistance to Change, Developing a Learning Organization Leadership: Introduction, Managers V/s Leaders. Overview of Leadership- Traits and Types

Conflict Management: Sources of Conflict, Types of Conflict, Conflict Management Approaches.

Text Books:

1. Pareek Udai: "Understanding Organizational Behavior", Oxford University Press, New Delhi, 2007.
2. K.Aswathappa: "Organizational Behavior-Text, Cases and Games", Himalaya Publishing House, NewDelhi,2008.
3. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma: "Organizational Behavior", Tata McGraw Hill Education, New Delhi, 2008.

Reference Books:

1. Jerald Greenberg and Robert a Baron: "Behavior in Organizations", PHI Learning Pvt Ltd, New Delhi,2009.
2. Robbins, Stephen P. Organizational behavior, 14/E. Pearson Education India,2001.

STRENGTH OF MATERIALS LAB

III SEMESTER

Lecture:0	Practical:3	Internal Marks	40
Credits:1.5		External Marks	60

Course Objectives

- To introduce various stress and strain measuring equipment.
- To familiarize with various physical, mechanical and strength properties of various engineering materials.

List of Experiments

1. To study the stress-strain characteristics of Mild steel/HYSD bars using UTM.
2. To determine young's modulus of the given material (steel or wood) by bending test on simply supported beam
3. To determine young's modulus of the given material (steel or wood) by conducting bending test on Cantilever beam.
4. To calculate modulus of rigidity by conducting torsion test on solid circular shaft.
5. To obtain the hardness of the given material by Brinnel's Hardness tester.
6. To obtain the hardness of the given material by Rockwell Hardness tester.
7. To determine the modulus of rigidity of the spring.
8. To evaluate Compressive Strength of wood or Brick.
9. To determine impact resistance of the given material by conducting Charpy test on Impact testing machine.
10. To determine impact resistance of the given material by conducting Izod test on Impact testing machine
11. To determine the ultimate shear strength of steel rod in single and double shear.
12. To Verify the Maxwell's Reciprocal theorem on beams.

SURVEYING FIELD WORK - I

III SEMESTER

Lecture:0 Practical:3	Internal Marks : 40
Credits: 1.5	External Marks : 60

Course Objectives

- To familiarize with surveying equipment/ instruments like chain, compass, levelling instruments, theodolite and total station
- To impart the knowledge on linear, angular measurement

List of Field Works

Chain & Compass survey

1. Area calculation of closed traverse using chain survey
2. Determination of distance between two inaccessible points using compass.
3. Survey by chain survey of road profile with offsets in case of road widening
4. Finding the area of the given boundary using prismatic compass

Levelling

5. Determination of reduced levels using Height of the instrument method
6. Determination of reduced levels using rise and fall method.
7. Determination of Longitudinal Section and Cross sections of a given road profile
8. Fly Levelling: Closed circuit/ open Circuit

Plane table Surveying

9. Finding the area of a given boundary by the method of radiation
10. Finding the area of a given boundary by the method of Intersection
11. Two point problem by the plane table survey

IV

SEMESTER

SYLLABUS

PROFESSIONAL PRACTICE, LAW & ETHICS

IV SEMESTER

Lecture: 2	Tutorial: 0	Internal Marks	: 30
Credits: 2		External Marks	: 70

Course Objectives:

- To familiarize the students to what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession
- To give a good insight into contracts and contracts management in civil engineering, dispute resolution mechanisms; laws governing engagement overlabor
- To give an understanding of Intellectual Property Rights, Patents.
- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
- To develop good ideas of the legal and practical aspects of their profession

UNIT I

Professional Ethics –Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the- art; Vigil Mechanism, Whistleblowing, protected disclosures.

UNIT II:

General Principles of Contracts Management*:* Indian Contract Act, 1872 and amendments covering General principles of contracting; Contract Formation & Law; Privacy of contract; Various types of contract and their features; Valid & Voidable Contracts; Prime and sub- contracts; Tenders, Request For Proposals, Bids & Proposals; Bid Evaluation; Contract Conditions & Specifications;; Differing site conditions; Cost escalation; Delays, Suspensions & Terminations; Delay Analysis; Liquidated damages & Penalties; Insurance & Taxation; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Public- Private Partnerships; International Commercial Terms

UNIT III:

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system: Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok adalats

UNIT IV:

Engagement of Labour and Labour & other construction-related Laws: Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017

UNIT V:

Law relating to Intellectual property: Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products, Duration of patents – law and policy considerations, Infringement and related remedies

Text/Reference Books:

1. B.S. Patil, Legal Aspects of Building and Engineering Contracts,1974.
2. The National Building Code, BIS,2017
3. Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. ProfessionalOffset
4. Neelima Chandiramani (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications Mumbai
5. Dutt (1994), Indian Contract Act, Eastern LawHouse
6. Anson W.R. (1979), Law of Contract, Oxford UniversityPress
7. Kwatra G.K. (2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council ofArbitration
8. Wadhera (2004), Intellectual Property Rights, Universal Law PublishingCo.
9. Bare text (2005), Right to Information Act
10. K.M. Desai(1946), The Industrial Employment (Standing Orders)Act
11. Rustamji R.F., Introduction to the Law of Industrial Disputes, Asia PublishingHouse
12. Ethics in Engineering- M.W.Martin& R.Schinzinger,McGraw-Hill
13. Engineering Ethics, National Institute for Engineering Ethics,USA
14. Engineering ethics: concepts and cases – C. E. Harris, M.S. Pritchard,M.J.Rabins

ENERGY SCIENCE & ENGINEERING

IV SEMESTER

Lecture:2	Tutorial:0	Internal Marks	30
Credits:2		External Marks	70

Course Objectives:

- Have basic understanding of the energy sources and scientific concepts/principles behind them.
- Understand effect of using these sources on the environment and climate
- Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.
- List and describe the primary renewable energy resources and technologies.
- To quantify energy demands and make comparisons among energy uses, resources, and technologies.
- Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.
- Understand the Engineering involved in projects utilizing these sources.

UNIT -I:

Introduction to Energy Science: Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability & the Environment.

UNIT -II:

Energy Sources: Overview of energy systems, sources, transformations efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration (Ex. Pumped storage hydro power projects, superconductor-based energy storages, high efficiency batteries)

UNIT - III:

Energy & Environment: Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental outcomes; How future energy use can be influenced by economic, environmental, trade, and research policy

UNIT -IV:

Civil Engineering Projects connected with the Energy Sources: Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams, tunnels, penstocks, etc.; Nuclear reactor containment buildings and associated buildings, design and construction constraints and testing procedures for reactor containment buildings; Spent Nuclear fuel storage and disposal systems

UNIT -V:

Engineering for Energy conservation: Concept of Green Building and Green architecture; Green building concepts (Green building encompasses everything from the choice of building materials to where a building is located, how it is designed and operated); LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption

Text/Reference Books:

1. Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press
2. Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press
3. Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaiam
4. Jean-Philippe; Zaccour, Georges (Eds.), (2005), Energy and Environment Set: Mathematics of Decision Making, Loulou, Richard; Waaub, XVIII,
5. Ristinen, Robert A. Kraushaar, Jack J. AKraushaar, Jack P. Ristinen, Robert A. (2006) Energy and the Environment, 2nd Edition, John Wiley
6. UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment
7. E H Thorndike (1976), Energy & Environment: A Primer for Scientists and Engineers, Addison- Wesley Publishing Company
8. Related papers published in international journals

BUILDING PLANNING AND DRAWING

IV SEMESTER

Lecture: 3	Tutorial: 1	Internal Marks	: 30
Credits: 4		External Marks	: 70

Course Objectives:

1. To visualize, sketch and accurately draw shapes and objects to communicate information to specific audiences
2. To interpret, design, produce and evaluate a variety of graphical presentations using a range of manual based techniques
3. To use graphical conventions, standards and procedures in the design.

UNIT -I

Principles of Planning of a Building: Aspect-Prospect - Privacy-Furniture requirement – Roominess – Grouping – Circulation – Sanitation -Lighting - Ventilation-Cleanliness-Flexibility-Elegance-Economy-Practical Considerations

Building Byelaws and Regulations: Introduction – Terminology – Objectives of building byelaws – Floor Area Ratio (FAR) – Floor Space Index (FSI) – Principles underlying building byelaws
– classification of buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement – National Building Code (NBC) – Environmental aspects ofNBC

UNIT -II

Residential Buildings: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

Public Buildings: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT –III

Sign Conventions and Bonds: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT - IV

Doors, Windows, Ventilators and Roofs: Paneled Door – paneled and glazed door, glazed windows – paneled windows – Swing ventilator – Fixed Ventilator-Couple roof – Collar roof – Kind Post truss – Queen post truss.

UNIT – V

PLANNING OF BUILDINGS:

Draw the line diagrams and plans for the following as per National Building Code.

a) Single storied residential building
b) Primary School Building
c) Primary Health Centre
d) Commercial Building

DRAWING OF BUILDINGS: Preparation of plan, elevation and section of residential buildings- single storey (load bearing structures), double storey (R.C.C.Framed structure) by using principles of planning and local building bye- laws.

TEXT BOOKS:

1. Building planning designing and scheduling, (5th Edition) by Gurucharan Singh and Jagadish Sing, Standard Publications Distributers, Delhi,2010.
2. Building planning and drawing, (3rdedition) by Kumara Swami N., Anand Charotar Publishing House Pvt Ltd,2010.

REFERENCES

1. Building byelaws by state and Central Governments and Municipal corporations,2011.
2. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur,2012.

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part A consist of five questions in planning portion out of which three questions are to be answered. Part B should consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weight age for Part – A is 60% and Part- B is 40%.

PROFESSIONAL ELECTIVE- II:

(A). STRENGTH OF MATERIALS –II

IV SEMESTER

Lecture: 2	Tutorial: 1	Internal Marks	: 30
Credits: 3		External Marks	: 70

Course Objective:

To provide the basic concepts of Columns and Struts and calculation of stresses and deformations under Direct, Bending Stresses and in beams subjected to unsymmetrical bending so that to apply the knowledge of solids on engineering applications and design problems.

UNIT- I:

Torsion, Shafts & Springs, Theories of Failures: Torsion, Shafts & Spring: Torsion of circular and hollow shafts, Elastic Theory of torsion, Stresses and Deflection in circular solid and hollow shafts. Combined bending moment and torsion of shafts – Strain energy due to torsion- Modulus of Rupture – Power transmitted to shaft- shaft in series and parallel- Closed and open coiled helical springs- Leaf springs- Springs in series and parallel- Design of buffer springs. Theories of Failures: Introduction Various Theories of failures like Maximum Principal stress theory–Maximum Principal strain theory– Maximum shear stress theory – Maximum strain energy theory –Maximum shear strain energy theory (Von Mises Theory).

UNIT- II:

Columns and Struts: Introduction–Types of columns–Short, medium and long columns– Axially loaded compression members–Crushing load–Euler's theorem-assumptions-derivation of Euler's critical load formulae for various end conditions–Equivalent length of a column– slenderness ratio–Euler's critical stress–Limitations of Euler's theory– Rankine–Gordon formula– Long columns subjected to eccentric loading–Secant formula–Empirical formulae–Straight line formula–Prof. Perry's formula.

UNIT- III:

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section –determination of stresses in the case of chimneys, retaining walls and dams– conditions for stability–stresses due to direct loading and bending moment about both axis.

UNIT- IV:

Unsymmetrical Bending and Shear Centre Unsymmetrical Bending: Introduction– Centroidal principal axes of section– Graphical method for locating principal axes–Moments of inertia referred to any set of rectangular axes–Stresses in beams subjected to unsymmetrical bending– Principal axes–Resolution of bending moment into two rectangular axe through the centroid– Location of neutral axis-Deflection of beams under unsymmetrical bending. Shear Centre: Introduction-shear centre for symmetrical and unsymmetrical (Channel, I, T & L) Sections.

UNIT- V:

Analysis of Determinate Trusses: Introduction to degree of static indeterminacy – Analysis of Internally Determinate trusses using (i) Method of Joints (ii) Methods of Sections and (iii) Introduction to tension Coefficient Method.

TEXTBOOKS:

1. Rajput R.K. "Strength of Materials (Mechanics of Solids)", S.Chand & company Ltd., New Delhi,2015.
2. Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2011. 50
3. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain,"Theory of Structures" (SMTS) Vol - II, Laxmi Publishing Pvt Ltd, New Delhi2017.
4. Basavarajiah and Mahadevapa, Strength of Materials, University press, Hyderabad,2016
5. Mechanical Vibrations by S. S.Raut.

REFERENCES:

1. Kazimi S.M.A, “Solid Mechanics”, Tata McGraw-Hill Publishing Co., New Delhi,2003
2. William A .Nash, “Theory and Problems of Strength of Materials”, Schaum’s Outline Series, Tata McGraw Hill Publishing company,2007.
3. Singh. D.K., “ Strength of Materials”, Ane Books Pvt. Ltd., New Delhi,2016
4. Vazirani, V N, Ratwani M M. and S K Duggal “Analysis of Structures Vol. I”, 17th Edition, Khanna Publishers, New Delhi.

(B).ENVIRONMENTALGEO-TECHNOLOGY

IV SEMESTER

Lecture: 2	Tutorial: 1	Internal Marks	: 30
Credits: 3		External Marks	: 70

UNIT- I Fundamentals of Geo environmental Engineering: Scope of geo environmental engineering - multiphase behaviour of soil – role of soil in geo environmental applications – importance of soil physics, soil chemistry, hydrogeology, biological process – sources and type of ground contamination – impact of ground contamination on geo environment - case histories on geo environmental problems.

UNIT- II: Soil-Water-Contaminant Interaction Soil mineralogy characterization and its significance in determining soil behavior – soil-water interaction and concepts of double layer – forces of interaction between soil particles.

Concepts of unsaturated soil – importance of unsaturated soil in geo environmental problems measurement of soil suction - water retention curves - water flow in saturated and unsaturated zone.

Soil-water-contaminant interactions and its implications – Factors effecting retention and transport of contaminants.

UNIT- III Waste Containment System Evolution of waste containment facilities and disposal practices – Site selection based on environmental impact assessment –different role of soil in waste containment – different components of waste containment system and its stability issues – property evaluation for checking soil suitability for waste containment – design of waste containment facilities.

Unit -IV Contaminant Site Remediation Site characterization – risk assessment of contaminated site - remediation methods for soil and groundwater – selection and planning of remediation methods – some examples of in-situ remediation.

UNIT- V: Advanced Soil Characterization Contaminant analysis - water content and permeability measurements – electrical and thermal property evaluation – use of GPR for site evaluation - introduction to geotechnical centrifuge modeling.

Text Books:

1. Rowe R.K., "Geotechnical and Geoenvironmental Engineering Handbook" KluwerAcademic Publications, London,2000.
2. Reddi L.N. and Inyang, H. I., "Geoenvironmental Engineering, Principles and Applications" Marcel Dekker Inc. New York,2000.
3. Yong, R. N., "Geoenvironmental Engineering, Contaminated Soils, Pollutant Fate, and Mitigation" CRC Press, New York,2001.
4. Sharma H.D. and Reddy K.R., "Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies" John Wiley & Sons, Inc., USA, 2004.

(C).GREENTECHNOLOGIES

IV SEMESTER

Lecture: 2	Tutorial: 1	Internal Marks	: 30
Credits: 3		External Marks	: 70

Course Objectives:

The objective of this course is:

5. To present different concepts of green technologies.
6. To acquire principles of Energy efficient technologies.
7. To impart knowledge on the methods of reducing CO2 levels in atmosphere.
8. To gain knowledge of the importance of life cycle assessment
9. To learn the importance of green fuels and its impact on environment.

UNIT- I

Introduction: Green Technology – definition- Importance – Historical evolution – advantages and disadvantages of green technologies-factors affecting green technologies- Role of Industry, Government and Institutions – Industrial Ecology – role of industrial ecology in green technology.

UNIT- II

Cleaner Production (CP): Definition – Importance – Historical evolution - Principles of Cleaner Production–Benefits–Promotion – Barriers – Role of Industry, Government and Institutions – clean development mechanism, reuse, recovery, recycle, raw material substitution-Wealth from waste, casestudies.

UNIT- III

Cleaner Production Project Development and Implementation: Overview of CP Assessment Steps and Skills, Process Flow Diagram, Material Balance, CP Option Generation – Technical and Environmental Feasibility analysis – Economic valuation of alternatives - Total Cost Analysis – CP Financing – Preparing a Program Plan – Measuring Progress- ISO 14000.

UNIT- IV

Pollution Prevention and Cleaner Production Awareness Plan – Waste audit – Environmental Statement, carbon credit, carbon sequestration, carbon trading, Life Cycle Assessment - Elements of LCA – Life Cycle Costing – Eco Labelling.

UNIT- V

Green Fuels – Definition-benefits and challenges – comparison of green fuels with conventional fossil fuels with reference to environmental, economic and social impacts- public policies and market- driven initiatives.

Biomass energy: Concept of biomass energy utilization, types of biomass energy, conversion processes, Wind Energy, energy conversion technologies, their principles, equipment and suitability in Indian context; tidal and geothermal energy.

TEXT BOOKS:

1. 'Pollution Prevention: Fundamentals and Practice' by Paul L Bishop (2000), McGrawHill International.
2. 'Pollution Prevention and Abatement Handbook – Towards Cleaner Production' byWorld Bank Group (1998), World Bank and UNEP, WashingtonD.C.
3. 'Cleaner Production Audit' by Prasad Modak, C.Visvanathan and Mandar Parasnis (1995), Environmental System Reviews, No.38, Asian Institute of Technology,Bangkok
4. 'Handbook of Organic Waste Conversion' by BewikM.W.M.
5. 'Energy, The Solar Hydrogen Alternative' by BokrisJ.O.
6. 'Non-conventional Energy Sources' by RaiG.D.
7. 'Solar Energy' by SukhatmeS.P.
8. 'Waste Energy Utilization Technology' by Kiang Y.H.

(D).DISASTER MANAGEMENT

IV SEMESTER

Lecture: 2 Tutorial: 1	Internal Marks : 30
Credits: 3	External Marks : 70

Course Objectives:

The objective of this course is:

10. Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
11. Develop an awareness of the chronological phases of natural disaster response andrefugee relief operations.
12. Understand how the phases of each are parallel and how they differ.
13. Understand the 'relief system' and the 'disaster victim.'
14. Describe the three planning strategies useful in mitigation.
15. Identify the regulatory controls used in hazard management.
16. Describe public awareness and economic incentive possibilities.
17. Understand the tools of post-disaster management.

UNIT-I

Natural Hazards and Disaster Management: Introduction of DM – Inter disciplinary - nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides.

UNIT-II

Man Made Disaster And Their Management Along with Case Study Methods Of The Following: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrotirism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

UNIT-III

Risk and Vulnerability: Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.

UNIT-IV

Role of Technology in Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training transformable indigenous knowledge in disaster reduction.

UNIT-V

Education and Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action.

TEXT BOOKS:

1. 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy (2009), Universities press.
2. 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt. Ltd.

REFERENCE BOOKS:

1. 'Disaster Management' edited by H K Gupta (2003), Universities press

CONCRETE TECHNOLOGY

IV SEMESTER

Lecture: 3	Tutorial: 0	Internal Marks	: 30
Credits: 3		External Marks	: 70

Course objectives:

- Explain the functional role of ingredients of concrete and apply this knowledge to mix design philosophy
- Develop fundamental knowledge in the fresh and hardened properties of concrete
- Produce the testing methodology to evaluate the properties of concrete during fresh and hardened stage
- Knowledge on the behaviour of concrete with response to stresses developed.
- Knowledge on the special concretes and design a concrete mix which fulfils the required properties for fresh and hardened concrete

UNIT – I:

Ingredients of concrete: Cement-chemical composition-hydration process-Bogue's compound- Tests on properties of cement-Types of cement - I.S. Specifications. Aggregates-classification of aggregate – tests on properties of aggregates - characteristics of aggregate - I.S. Specifications. Water- quality of water - characteristics of water - I.S. Specifications. Admixtures – classification of chemical admixtures – properties and limitations – classification of mineral admixtures – properties and limitations - I.S. Specifications.

UNIT – II:

Properties of concrete: Fresh concrete: Mixing of concrete- workability-factors influencing workability- measurement of workability for conventional concrete (Slump Cone, Compaction Factor and Vee-Bee test) & SCC (V-Funnel, L-Box, U- Box, Slump Flow and J– Ring).
Hardened concrete: Water/Cement Ratio (Abram's Law)-Gel Space Ratio-tests on hardened concrete- Destructive Tests (Compression, Split Tensile and Flexural)-Semi Destructive Tests (Core Cutter and Pull out test) and Non-Destructive Tests (Rebound Hammer-UPV - Radiological methods).

UNIT – III

Elasticity, Shrinkage and Creep: Curing of concrete -methods of curing-effects of improper curing-self curing-Modulus of Elasticity-Poisson's Ratio-Dynamic Modulus of Elasticity- Shrinkage and various types -Factors Affecting Shrinkage-Moisture Movement-Creep of Concrete- Factors InfluencingCreep.

UNIT – IV

Special Concretes: Ready mixed concrete-Introduction, advantages and disadvantages Light weight aggregate concrete – Cellular concrete – No fines concrete– High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C, Polymer concrete
– Types of Polymer concrete – Properties of polymer concrete, High performance concrete – Self compacting concrete.

UNIT -V:

Concrete Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by BIS method of mix design Designing of two or three mix proportions and testing in the laboratory.

Text Books

1. Concrete Technology, M.S.Shetty, Edition -2006, S.Chand &Co
2. Properties of Concrete, A.M.Neville, 5thedition(2012),Pearson
3. Concrete Technology, Devadas Menon

Reference Books

1. Concrete Technology, M.L.Gambhir, 3rd edition TataMc.Graw Hill Publishers, New Delhi
2. Text Book of Concrete Technology, Mahaboob Bhasha,5th edition, Anuradha publications.
3. Concrete Technology by A.R. Santha Kumar, Edition-2013, Oxford University Press, New Delhi.
4. Design of Concrete Mixes by N.Krishnam Raju,2nd edition, CBS Publishers &Distributors
5. IS 456:2000 Plain and Reinforced Concrete - Code of Practice.

HYDRAULIC ENGINEERING

IV SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

- Introduce concepts of laminar and turbulent flows
- To understand the concept of boundary layer flows
- To teach principles of uniform and non-uniform flows through open channel.
- To impart knowledge on design of turbines.
- To impart knowledge on design of pumps.

UNIT -I:

Laminar & Turbulent flow in pipes: Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke's law, Measurement of viscosity. Turbulent Flow-Reynolds experiment, Transition from laminar to turbulent flow. Definition of turbulence, scale and intensity, Causes of turbulence, instability, mechanism of turbulence and effect of turbulent flow in pipes. Prandtl's mixing length theory, universal velocity distribution equation; Boundary Layer Analysis-Assumption and concept of boundary layer theory. Boundary-layer thicknesses. Laminar sub-layer; Local and average friction coefficients.

UNIT -II:

Uniform flow in Open Channels: Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, Velocity Distribution of channel section. Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Computation of Uniform flow, Normal depth.

UNIT III:

Non-Uniform flow in Open Channels: Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity Broad Crested Weir. **Gradually Varied Flow** Dynamic Equation of Gradually Varied Flow, Hydraulic Jump and classification, Elements and characteristics- Energy dissipation.

UNIT -IV:

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes velocity triangles at inlet and outlet - Work done and efficiency

Hydraulic Turbines: Classification of turbines; pelton wheel and its design. Francis turbine and its design - Kaplan turbine and its design – efficiency - Draft tube: theory – characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT -V:

Centrifugal pumps: Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies.

TEXT BOOKS:

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House
2. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi.
3. Rajput, Fluid mechanics and fluid machines, S. Chand &Co
   D. S. Kumar Fluid Mechanics & Fluid Power Engineering, Kataria &Sons.

REFERENCES:

1. K. Subramanya, Open channel Flow, Tata McGraw-Hill.
2. Srinivasan, Open channel flow by, Oxford University Press
3. Banga & Sharma, Hydraulic Machines, Khanna Publishers.

SURVEYING FIELD WORK - II

IV SEMESTER

Lecture: 0	Practical: 4	Internal Marks	: 40
Credits: 2		External Marks	: 60

Course Objectives

- To familiarize with surveying equipment/ instruments like chain, compass, levelling instruments, theodolite and total station
- To impart the knowledge on linear, angular measurement

List of Experiments Theodolite Survey:

- Determining the Horizontal and Vertical Angles by the method of repetition method.
- Determining the Horizontal angle by the method of reiteration
- Finding the distance between two inaccessible points
- Finding the height of far object

Tacheometric Survey:

- Heights and distance problems using tachometric principles
- One Exercise on Curve setting
- One Exercise on contours.

Total Station:

- Introduction to total station and practicing setting up, leveling up and elimination of parallax error.
- Determination of area using total station
- Traversing by using total station
- Determination of Remote height.
- Distance between two inaccessible points
- Contouring by using total station

CONCRETE TECHNOLOGY LAB

IV SEMESTER

Lecture:0	Practical:3	Internal Marks	: 40
Credits: 1.5		External Marks	: 60

Course Objectives

- To develop the skill of testing the building materials like cement &aggregates.
- To impart the knowledge on properties of fresh concrete.
- To familiarize with the strength properties of hardened Concrete.
- To introduce the concepts of non-destructive testing.

List of Experiments

I. Tests on Cement

- Normal Consistency and Fineness of Cement. (IS: 4031-PART 4&1)
- Initial and Final Setting Times of Cement. (IS: 4031-PART5)
- Specific Gravity and Soundness of Cement. (IS: 4031-PART 11&3).
- Compressive Strength of Cement. (IS: 4031-PART6)

II. Tests on Fine Aggregate

- Specific Gravity and Bulking of Sand (IS: 2386-PART3)
- Fineness Modulus and Grading of Fine aggregate (IS:383)

III. Tests on Coarse Aggregate

- Specific Gravity of Coarse aggregate. (IS: 2386-PART3)
- Fineness Modulus of Coarse aggregate. (IS: 2386-PART1)
- Flakiness index of coarse aggregate. (IS: 2386-PART1)
- Elongation index of coarse aggregate. (IS: 2386-PART1)

IV. Tests on Fresh and Hardened Concrete

- Workability test on concrete by compaction factor, slump and Vee-bee. (IS:1199)
- Compressive strength, split tensile strength and flexural strength of concrete (IS:516)
- Non-Destructive testing on concrete by Rebound hammer. (IS: 13311-PART1)

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

IV SEMESTER

Lecture:0	Practical:3	Internal Marks	: 40
Credits: 1.5		External Marks	: 60

Course Objectives

- To impart the knowledge on flow measurement through closed conduit/tank/channel.
- To familiarize with various losses in closed conduits.
- To familiarize with performance curves for various hydraulic turbines and pumps.

List of Experiments

1. Calibration of Venturi meter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.

V

SEMESTER

SYLLABUS

ENGINEERING GEOLOGY

IV SEMESTER

Lecture:2	Tutorial:0	Internal Marks	30
Credits:2		External Marks	70

Course Objectives:

The objective of this course is:

- To introduce the Engineering Geology as a subject in Civil Engineering
- To introduce various geophysical methods to the student and its applications in major projects investigations.
- To know the Geological history of India.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

- Identify and classify the geological minerals
- Identify the rock strengths of various rocks
- Classify the earthquake prone areas to practice the hazard zonation
- Classify and, monitor the Landslides and subsidence
- Analyses and interpret the Engineering Geological maps
- Analyses the ground conditions from geophysical surveys.
- Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.…

SYLLABUS:

UNIT-I Introduction: Introduction of Engineering Geology. Branches of Geology useful to Civil Engineering: Scope of geological studies in various Civil engineering projects: Central and State Departments dealing with geology

Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development. Types of Land forms- Mountains- Plateaus- Glaciers and Deserts.

UNIT-II Mineralogy and Petrology:

Mineralogy -Introduction to mineralogy Mineral Identification by Physical properties. Modern Methods of mineral identification- SEM, XRD, EPMA and XRF.

Petrology –Classification of Rocks, Rock cycle Igneous rocks – Formation, Structure and Texture- Sedimentary rocks – Formation, Structure and Textures, Metamorphic rocks and metamorphism – Formation, Structure and Textures, Engineering concerns of rocks.

UNIT –III Deformation and strength Behavior of Rocks – Concept of rock deformation Rock outcrops- Types- strike and Dip; **Folds**- Parts & Types; **Faults**-Types- Parts & Types; **joints**-Parts & Types and Unconformities
Maps: Maps and their interpretation- Topographic Map and Geological Map

UNIT-IV Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.
Geological Hazards
Landslides -Type of landslides, Factor of Safety, Slope Protection and Maintenance
Earthquakes - Causes and effects of earthquakes Earthquake Magnitude and intensity scales. seismic zones of India

UNIT-V Geophysical Methods- Principles of exploration geophysical Methods Electrical Resistivity method- Interpretation, Seismic refraction method- Interpretation
Geology for Major projects Dams - Site selection for dams, Geological investigation methods for dams Reservoirs- Failure of reservoirs, Reservoir suitable rocks, Reservoir induced seismicity Tunnels- Site selection for tunnels, Geological investigation methods for Tunnel

Text Books:

1. "Fundamentals of Engineering Geology" F.G. Bell, B. S. P. Publications,2012
2. Engineering Geology, N. Chenna Kesavulu, Laxmi Publications, 2nd Edition,2014.
3. Engineering Geology, Subinoy Gangopadhay, Oxford University press.

References:

1. Engineering Geology, D. Venkat Reddy, Vikas Publishing House pvt. Ltd,2013.
2. Engineering Geology, Vasudev Kanithi, University Press.
3. Engineering Geology for Civil Engineers P. C. Varghese, PHI learning pvt. Ltd.
4. Geology for Engineers and Environmental Society, Alan E Kehew, person publications, 3rd edition.
5. Engineer's Geology by S. K. Duggal, H.K. Pandey, N. Rawd, McGraw Hilleducation.
6. Engineering Geology, K. S. Valdiya, McGrawHill.

TRANSPORTATION ENGINEERING

V SEMESTER

Lecture:2	Tutorial:0	Internal Marks	30
Credits:2		External Marks	70

Course Learning Objectives:

The objectives of this course are:

- To impart different concepts in the field of Highway Engineering.
- To acquire design principles of Highway Geometrics and Pavements
- To learn various highway construction and maintenance procedures

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

- Plan highway network for a given area.
- Determine Highway alignment and design highway geometrics
- Design Intersections and prepare traffic management plans
- Judge suitability of pavement materials and design flexible and rigid pavements
- Construct and maintain highways

SYLLABUS:

UNIT I: Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plan, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys

Highway Materials: Subgrade soil: classification –Group Index – Subgrade soil strength – California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates: Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties – Tests on Bitumen, uses of waste materials in pavements-Recycling of Highway Materials – Using Plastic waste as Road Material.

UNIT – II: Highway Geometric Design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical Alignment-Gradients- Vertical curves.

UNIT – III: Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density-Traffic Volume Studies; Speed studies –spot speed and speed & delay studies; Parking Studies; PCU Factors, Road Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections.

UNIT – IV: Highway Construction and Maintenance: Types of Highway Construction – Earthwork; Construction of Earth Roads, Gravel Roads, Water Bound Macadam Roads, Bituminous Pavements and Construction of Cement Concrete Pavements. Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existing pavements

UNIT – V: Design of Pavements: Types of pavements; Functions and requirements of different components of pavements;
Flexible Pavements: Design factors – Flexible Pavement Design Methods – CBR method – group index method – IRC recommendations for Flexible pavements.
Rigid Pavements: Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs
Highway Drainage: importance of highway drainage; requirements; surface drainage and sub surface drainage

TEXT BOOKS:

1. Highway Engineering, Khanna S. K., Justo C. E. G and Veeraragavan A, Nem Chand Bros., Roorkee.
2. Traffic Engineering and Transportation Planning, Kadiyali L. R, Khanna Publishers, New Delhi.

REFERENCES:

1. Principles of Highway Engineering, Kadiyali L. R, Khanna Publishers, NewDelhi
2. Principles of Transportation Engineering, Partha Chakroborthy and Animesh Das, PHI Learning Private Limited, Delhi
3. Highway Engineering, Paul H. Wright and Karen K Dixon, Wiley Student Edition, Wiley India (P) Ltd., New Delhi
4. Transportation Engineering - An Introduction, JotinKhisty C, Prentice Hall, Englewood Cliffs, NewJersey.
5. Traffic & Highway Engineering by Nicholas J. Garber, Lester A. Hoel, Fifth Edition, published in 2015, CENGAGE Learning, New Delhi.
6. Transportation Engineering and Planning, Papacostas C.S. and P.D. Prevedouros, Prentice Hall of India Pvt.Ltd; New Delhi.

STRUCTURAL ANALYSIS

V SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

- To give preliminary concepts of assessment of bending moment and shear force in Propped cantilevers, fixed beams and continuous beams due to various loading conditions.
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions
- The procedure for development of slope deflection equations and to solve application to continuous beams with and without settlement of supports.
- The concepts of moving loads and influence lines are imparted for assessment of maximum SF and BM at a given section when loads of varying spans.

Course Outcomes:

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

- Distinguish between the determinate and indeterminate structures.
- Identify the behavior of structures due to the expected loads, including the moving loads, acting on the structure.
- Estimate the bending moment and shear forces in beams for different fixity conditions.
- Analyze the continuous beams using various methods, three moment method, slope deflection method, energy theorems.
- Draw the influence line diagrams for various types of moving loads on beams/bridges.

Syllabus:

UNIT – I Introduction to degree of static and kinematic indeterminacy of structural members, 2D and 3D frames.

Propped Cantilevers: Analysis of propped cantilevers-shear force and Bending moment diagrams-Deflection of propped cantilevers.

UNIT – II Fixed Beams – Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

UNIT – III Continuous Beams: Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed- continuous beams with overhang, continuous beams with different moment of inertia for different spans- Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-IV Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

Moment Distribution Method: Analysis of continuous beams with and without settlement of supports using -Analysis of Single Bay Single Storey Portal Frames including side Sway --Shear force and Bending moment diagrams, Elastic curve.

UNIT –V Moving Loads And Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load, U. D load longer than the span, U. D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

Influence Lines: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section, single point load, U.D. load longer than the span, U.D.L load shorter than the span.

Text Books:

1. Basic Structural Analysis, C. S. Reddy Tata Mc.Graw-Hill, New Delhi.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
3. Analysis of Structures- Vol. I and II, V. N. Vazirani and M. M. Ratwani, Khanna Publishers, New Delhi

References:

1. Theory of Structures, B. C Punmia, A. K Jain & Arun K. Jain, Lakshmi Publications
2. Theory of Structures, R.S. Khurmi, S. ChandPublishers.
3. Structural analysis by R.C. Hibbeler, Pearson, New Delhi.
4. Structural Analysis-I, Hemanth Patel, Yogesh Patel, Synergy Knowledgeware, Mumbai
5. Structural Analysis I Analysis of Statically Determinate Structures, P. N.Chandramouli, Yesdee Publishing Pvt Limited, Chennai.
6. Structural Analysis by Devdas Menon

GEOTECHNICAL ENGINEERING

V SEMESTER

Lecture:2 Tutorial:1		Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- To enable the student to find out the index properties of the soil and classify it.
- To impart the concept of seepage of water through soils and determine the seepage discharge.
- To enable the students to differentiate between compaction and consolidation of soils and to determine the magnitude and the rate of consolidation settlement.
- To enable the student to understand the concept of shear strength of soils, assessment of the shear parameters of sands and clays and the areas of their application.

Course Outcomes:

Upon the successful completion of this course

- The student must know the definition of the various parameters related to soil mechanics and establish their inter-relationships.
- The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
- The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
- The student should be able to apply the above concepts in day-to-day civil engineering practice.

SYLLABUS:

UNIT – I Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density, Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

UNIT – II Index Properties Of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT –III Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition.

Seepage through soils: 2-D flow and Laplace's equation - Seepage through soils – Flow nets: Characteristics and Uses.

UNIT – IV Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (c_v) - Over consolidated and normally consolidated clays.

UNIT – V

Stress Distribution in Soils: Stresses induced by applied loads - Boussinesq's and Westerguard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.

Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.

Text Books:

1. Basic and Applied Soil Mechanics, Gopal Ranjan and A. S. R. Rao, New Age International Publishers.
2. Soil Mechanics and Foundation Engineering, V. N. S. Murthy, CBS publishers

References:

1. Fundamentals of Soil Mechanics, D. W. Taylor, Wiley.
2. An introduction to Geotechnical Engineering, Holtz and Kovacs; Prentice Hall.
3. Fundamentals of Geotechnical Engineering, B M Das, Cengage Learning, New Delhi.
4. Craig's Soil Mechanics by J.A. Knappet & R. F. Craig, 8th Edition.

HYDROLOGY AND WATER RESOURCES ENGINEERING

V SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The course is designed to

- Introduce hydrologic cycle and its relevance to Civil engineering
- Appreciate the water resources of India
- Make the students understand physical processes in hydrology and, components of the hydrologic cycle and estimation
- Provide an overview and understanding of Unit Hydrograph theory and its analysis
- Understand flood frequency analysis, design flood, flood routing
- Appreciate the concepts of groundwater movement and well hydraulics

Course Outcomes

At the end of the course the students are expected to

- Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology
- Develop Unit hydrograph, Intensity-Duration-Frequency to design hydraulic structures.
- Be able to develop design storms and carry out frequency analysis
- Be able to estimate flood magnitude and carry out flood routing.
- Be able to determine aquifer parameters and yield of wells.

SYLLABUS:

UNIT I Introduction: Engineering hydrology and its applications, Hydrologic cycle, Water resources of India, AP and Telangana, Water resources terminology, Hydrological data-Sources of data in India – Study on Srisailam, Nagarjuna Sagar , Polavaram and Kaleswaram Projects.

Precipitation: Types and forms, measurement, rain gauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves.

UNIT-II Abstractions from Precipitation: Initial abstractions.
Evaporation: factors affecting, measurement, reduction
Evapotranspiration: factors affecting, measurement, control
Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.

UNIT-III Runoff: Catchment characteristics**,** Factors affecting runoff, components, computation- empirical formulae.
Hydrograph analysis: Components of hydrograph, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, construction of a flood hydrograph resulting from rainfall of unit duration; Application of unit hydrograph to construction of a flood hydrograph resulting from two or more periods of rainfall; Construction of unit hydrograph of different unit duration from a unit hydrograph of some given unit duration, S- hydrograph methods, limitations of unit hydrograph

UNIT-IV Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods; Terminology of flood - Standard Project Flood (SPF), Probable Maximum Precipitation (PMP), Probable Maximum Flood (MPF),Design storm and Design flood; Flood control methods and management.
Flood Routing: Methods, Muskingum method of flood routing.

UNIT-V Well Hydrology: Introduction; Aquifer; Aquicludes; Aquifuge; Specific yield; Specific retention; Divisions of sub–surface water; Water table; types of aquifers; Darcy's law; Dupit's theory for confined and unconfined aquifers; Constant level pumping test, Recuperation test.

Rainfall-runoff Modelling: Introduction to runoff models, Clark and Nash models

Text Books:

1. Engineering Hydrology, Jayarami Reddy, P., Laxmi Publications Pvt. Ltd., (2013), NewDelhi
2. Irrigation and Water Power Engineering, B. C. Punmia, Pande B. B. Lal, Ashok Kumar Jain and Arun Kumar Jain, Lakshmi Publications (P)Ltd.

References:

1. Engineering Hydrology Subramanya, K, Tata McGraw-Hill Education Pvt Ltd, (2013), New Delhi.
2. Irrigation Engineering and Hydraulic Structure, Santosh Kumar Garg, Khanna Publishers.
3. Applied hydrology, Chow V. T., D. R Maidment and L.W. Mays, Tata McGraw Hill Education Pvt Ltd, (2011), New Delhi.
4. Water Resources Engineering, Mays L.W, Wiley India Pvt. Ltd,(2013).

STRUCTURAL ENGINEERING-I (RCC)

V SEMESTER

Lecture:3	Tutorial:0	Internal Marks	30
Credits:4	Practical:2	External Marks	70

Course Learning Objectives

- Identify the basic components of any structural system and the standard loading for the RC structure
- Identify and tell the various codal provisions given in IS.456
- Describe the salient feature of limit state method, compare with other methods and the concepts of limit state of collapse and limit state of serviceability
- Evaluate the behavior of RC member under flexure, shear and compression, torsion and bond.

Course Outcomes

After the completion of the course student should be able to

- Compare and Design the singly reinforced, doubly reinforced and flanged sections.
- Design the axially loaded, uniaxial and biaxial bending columns.
- Classify the footings and Design the isolated square, rectangular and circular footings
- Distinguish and Design the one-way and two-way slabs.

UNIT –I

Introduction- Structure - Components of structure - Different types of structures – Loading standards as per IS:875 – Different types of Loads – Dead Load, Live Load, Earthquake Load and Wind Load – Different types of materials -RCC, PSC and Steel - Concepts of RCC Design – Difference between RCC and PCC - Different methods of Design- Working Stress Method and Limit State Method – Load combinations as per Limit state method - Materials - Characteristic Values – Partial safety factors – Behaviour and Properties of Concrete and Steel.

ALL DESIGNS IN LIMIT STATE METHOD ONLY

Limit state Analysis and design of sections in Flexure – Stress Block Parameters as per IS:456 - 2000 - Behavior of RC section under flexure – Design of singly reinforced and doubly reinforced Rectangular section and singly reinforced flanged sections– Detailing of reinforcement.

UNIT – II

Design for Shear, Bond, and Torsion: - Mechanism of shear and bond failure - Design of shear using limit state concept – Design for Bond –Anchorage and Development length of bars - Design of sections for torsion - Detailing of reinforcement

UNIT – III

Limit state design of serviceability for deflection, cracking – IS:456-2000 Codal provisions. Design and detailing of one-way slab, and continuous slab and Two-way slabs with different end conditions Using IS Coefficients.

UNIT – IV

Define short and Long columns - effective length – Code requirements of slenderness limits – minimum eccentricity - Design of Short Column under axial compression with lateral ties and helical reinforcement.

Design of short column subjected to combined axial load – uniaxial moment or bi-axial moment - Use of design charts as per SP 16.

UNIT – V

General aspects of footing - Different types of footings, Minimum Depth of Foundation, Design and detailing of isolated rectangular and square footing. IS Codal Provisions for footings.

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, PHI Learning Pvt.Ltd.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age international Publishers.

REFERENCES:

1. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.GrawHill.
2. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd.
3. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Pvt. Ltd.
4. Design of Reinforced Concrete Structures by N.Subramanian, Oxford University Press
5. Design of concrete structures by J.N.Bandhyopadhyay PHI Learning Private Limited.
6. Design of Reinforced Concrete Structures by I.C.Syal and A.K.Goel, S.Chand & company.
7. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India.

NOTE:

Alternate weeks two periods of theory can be converted into drawing classes. The end examination paper should consist of Part – A and Part – B. Part – A should consist of two questions in design and drawing of which one question to be answered. Part –B should consist of five questions in design out of which three to be answered. Weightage for Part – A is 40 % and Part – B is 60 %.

ENGINEERING GEOLOGY LAB

V SEMESTER

Lecture: 0	Practical: 3	Internal Marks	: 40
Credits:1.5		External Marks	: 60

Course Objectives: The objective of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

List of Experiments

1. Study of physical properties of minerals.
2. Study of different group of minerals.
3. Identification of minerals: Silica group: Quartz, Amethyst, Opal; Feldspar group: Orthoclase, Plagioclase; Cryptocrystalline group: Jasper; Carbonate group: Calcite;
   Element group: Graphite; Pyroxene group: Talc; Mica group: Muscovite; Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum.
4. Identification of rocks (Igneous Petrology): Acidic Igneous rock: Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Pegmatite, Volcanic Tuff. Basic rock: Gabbro, Dolerite, Basalt and its varieties, Trachyte.
5. Identification of rocks (Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties, Laterite, Limestone and its varieties, Shales and its varieties.
6. Identification of rocks (Metamorphic Petrology): Marble, slate, Gneiss and its varieties, Schist and its varieties. Quartzite, Phyllite.
7. Study of topographical features from Geological maps. Identification of symbols in maps.
8. Simple structural Geology Problems (Strike & Dip and Bore hole data)

Course Outcomes: At the end of the course, the student will be able to:

- Understands the method and ways of investigations required for Civil Engineering projects
- Identify the various rocks, minerals depending on geological classifications
- Will able to learn to couple geologic expertise with the engineering properties of rock and unconsolidated materials in the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement.
- Write a technical laboratory report

LAB EXAMINATION PATTERN:

1. Description and identification of minerals
2. Description and identification of rocks (igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problem.
5. Simple bore hole data problem.

GEOTECHNICAL ENGINEERING LAB

V SEMESTER

Lecture: 0 Practical: 3	Internal Marks : 40
Credits:1.5	External Marks : 60

Course Objectives: To obtain index and engineering properties of locally available soils, and to understand the behavior of these soil under various loads.

LIST OF EXPERIMENTS

1. Grain size distribution by sieve analysis
2. Determination of Specific gravity of soil by pycnometer
3. Atterberg Limits (Liquid Limit, Plastic Limit, and shrinkage limit), Differential free swell index (DFSI)test
4. a) Field density by core cutter method and

   b) Field density by sand replacement method
5. Permeability of soil by constant and variable head test methods
6. Standard Proctor's Compaction Test
7. Determination of Coefficient of consolidation (square root time fitting method)
8. Unconfined compression test
9. Direct shear test
10. Vane shear test
11. Tri-Axial Test (unconsolidated and undrained)

Course Outcomes: At the end of the course, the student will be able to classify and evaluate the behavior of the soils subjected to various loads.

REFERENCE:

1. Measurement of Engineering Properties of Soils by. E. Saibaba Reddy & K. Rama Sastri, New Age International

CONSTITUTION OF INDIA

V Semester

Lecture: 2 Tutorial: 0	Internal Marks : 00
Credits: 0	External Marks : 00

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative.

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

UNIT-IV

A Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation Pachayati Raj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission, Functions of Commissions for the welfare of SC/ST/OBC and women.

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

VI

SEMESTER

SYLLABUS

STRUCTURAL ENGINEERING -II (STEEL)

V SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Objectives

- Explain the mechanical properties of structural steel, plasticity, yield.
- Describe the salient features of Limit State Method of design of Steel structures.
- Identify and explain the codal provisions given in IS.800.
- Analyze the Behaviour of steel structures under tension, compression and flexure.
- Design the tension, Compression, flexural members and plate girder
- Design the connection in steel structure, 'build -up member and (bolted and welded).

Course Outcomes:

After the completion of the course student should be able to

- Analyze the tension members, compression members
- Design the tension members, compression members and column bases and joints and connections
- Analyze and Design the beams including built-up sections and beam and connections.
- Identify and Design the various components of welded plate girder including stiffeners

SYLLABUS

UNIT – I

Materials: Types of structural steel, Mechanical properties of steel, Concepts of plasticity, yield strength, Loads and Stresses, Local buckling behavior of steel. Concepts of limit State Design – Different Limit States – Load combinations for different Limit states, Design Strengths, deflection limits, serviceability, stability check.

Design of Connections: Different types of connections, Bolted connections, Design strength, efficiency of joint, prying action, Welded connections, Types of welded joints – Design requirements, Design of Beam, column connections, Eccentric connections, Type I and Type II connection – Framed connection.

UNIT – II

Flexural Members: Plastic moment, Plastic section modulus for different sections, Design of Flexural Members, laterally supported and unsupported Beams – Design of laterally supported beams, Bending and shear strength/buckling, Built-up sections Beam splice

UNIT – III

Design of tension members –Simple and built up members - Design strength – Design procedure for splicing - lug angle.

Design of compression members – Buckling class – slenderness ratio –Design of simple compression members and struts.

UNIT – IV

Design of Columns - Built up compression members-Design of Lacings and Battened Columns-Design principle of eccentrically loaded columns-Splicing of columns- Design of Column Foundation-Design of slab base and gusseted base.

UNIT – V

Design of welded plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffeners - bearing stiffener– intermediate stiffeners – Design of web splice and flange splice.

Design of Gantry Girder: Impact Factors-Longitudinal and Lateral Forces- Design of Gantry Girder.

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Note: ***Design of structural members include detailed sketches.***

Text Books:

1. Design of steel structures by S.K.Duggal, Tata Macgrawhill publishers,2000,2nd Edition
2. Design of steel structures by N.Subramanian , Oxford Universitypress,2008

Reference Books:

1. Design of steel structures by K.S.Sairam, P earson Educational India, 2ndEdition,2013
2. Design of steel structures by Edwin H.Gayrold and Charles Gayrold, Tata Mac-grawhill publishers,1972
3. Design of steel structures by L. S. JayaGopal, D.Tensing, Vikas Publishing House
4. IS- 800

NOTE:

Alternate weeks two periods of theory can be converted into drawing classes. The end examination paper should consist of Part – A and Part – B. Part – A should consist of two questions in design and drawing out of which one question to be answered. Part –B should consist of five questions in design out of which three to be answered. Weightage for Part – A is 40 % and Part – B is 60 %.

ENVIRONMENTAL ENGINEERING - I

VI SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The course will address the following:
- Outline planning and the design of water supply systems for a community/town/city
- Provide knowledge of water quality requirement for domestic usage
- Impart understanding of importance of protection of water source quality and enlightens the efforts involved in converting raw water into clean potable water.
- Selection of valves and fixture in water distribution systems
- Impart knowledge on design of water distribution network

Course Outcomes:

Upon the successful completion of this course, the students will be able to:
- Plan and design the water and distribution networks and sewerage systems
- Identify the water source and select proper intake structure
- Characterization of water
- Select the appropriate appurtenances in the water supply
- Selection of suitable treatment flow for raw water treatments

SYLLABUS:

UNIT–I

Introduction: Importance and Necessity of Protected Water Supply systems, Water borne diseases, Flow chart of public water supply system. Water Demand and Quantity Estimation: Estimation of water demand, Per capita Demand, Types of water demands, Design Period, Factors affecting the Design period, Population Forecasting. **Sources of Water:** Surface water and Subsurface water, selection of sources with reference to quality, quantity and other considerations.

UNIT-II

Collection and Conveyance of Water: Factors governing the selection of the intake structure, Types of Intakes. Conveyance of Water: Gravity and Pressure conduits, Types of Pipes, Pipe Materials, Pipe joints, Design aspects of pipe lines, laying of pipe lines.

Quality and Analysis of Water: Characteristics of water–Physical, Chemical and Biological-Analysis of Water, Comparison of sources with reference to quality- I.S. Drinking water quality standards (IS 10500-2012) and WHO guidelines for drinking water.

UNIT–III

Treatment of Water: Flowchart of water treatment plant, Treatment methods: Theory and Design of Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration Process.

UNIT-IV

Disinfection: Theory of disinfection, Disinfection methods. Softening of Water, Removal of color and odour - Iron and manganese removal –Adsorption-fluoridation and Deflouridation–aeration–Distillation Solar Stilts – Freezing- Reverse Osmosis-Ion exchange–Ultra filtration.

UNIT-V

Distribution of Water: Requirements- Methods of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Analysis of Distribution networks: Hardy Cross and equivalent pipe methods

Components of Distribution system: valves, hydrants, and water meters–Laying and testing of pipe lines- selection of pipe materials, pipe joints. Design of Water mains using hazen williams formula and Darcy Weisbach formula.

Text Books

1. Environmental Engineering – Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglus – Mc-Graw-Hill Book Company, New Delhi, 1985.
2. Elements of Environmental Engineering – K. N. Duggal, S. Chand & Company Ltd., New Delhi, 2012.

References

1.Water Supply Engineering – P. N. Modi.
2.Water Supply Engineering – B. C. Punmia
3.Water Supply and Sanitary Engineering – G. S. Birdie and J. S. Birdie
4.Environmental Engineering, D. Srinivasan, PHI Learning Private Limited, New Delhi, 2011.

PROFESSIONAL ELECTIVE – III

A). STRUCTURAL ANALYSIS -II

VI SEMESTER

Lecture:2 Tutorial:1		Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

The objectives of the course are to

- Familiarize students with different types of structures
- Identify the various actions inarches.
- Understand classical methods of analysis for statically indeterminate structures.
- Differentiate the approximate and numerical methods of analysis for indeterminate structures.
- Understand Analysis methods Moment Distribution , Kanis Method and Matrix Methods.

Course Outcomes

After the completion of the course student should be able to

- Analyze the three and two hinged arches.
- Solve statically indeterminate beams and portal frames using classical methods
- Sketch the shear force and bending moment diagrams for indeterminate structures.
- Formulate the stiffness matrix and analyze the beams by matrix methods

UNIT – I

ARCHES: Introduction – Classification of Three and Two hinged Arches –Elastic theory of arches-Eddy's theorem- Analysis of three and two hinged parabolic arches – Secondary stresses in three and two hinged arches due to temperature and elastic shortening of rib.

UNIT – II

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Deflections of simple beams and pin jointed trusses.

UNIT – III

KANI'S METHOD: Analysis of continuous beams including settlement of supports - Analysis of single bay single storey and single bay two Storey Frames including Side Sway using Kani's Method - Shear force and bending moment diagrams - Elastic curve.

UNIT – IV

APPROXIMATE METHODS OF ANALYSIS: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method. Introduction to Analysis of multi storey frames for gravity loads – Introduction to Substitute Frame method.

UNIT – V

MATRIX METHODS OF ANALYSIS: Introduction to Flexibility and Stiffness matrix methods of analyses using 'system approach' up to three degree of indeterminacy– Analysis of continuous beams including settlement of supports using flexibility and stiffness methods

Text Books:

1) Structural Analysis Vol –I &II by Vazarani and Ratwani, KhannaPublishers.
2) Structural Analysis Vol I & II by G.S. Pandit S.P.Gupta Tata McGraw Hill Education Pvt.Ltd.

References:

1. Indeterminate Structural Analysis by K.U.Muthu et al., I.K.International Publishing House Pvt.Ltd
2. Structural analysis T.S Thandavamoorthy, Oxford universityPress
3. Mechanics of Structures Vol –II by H.J.Shah and S.B.Junnarkar,Charotar Publishing House Pvt.Ltd.
4. Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
5. Examples in Structural Analysis by William M.C.McKenzie, Taylor &Francis.
6. Structural Analysis by R. C. Hibbeler, Pearson Education
7. Structural Analysis by Devdas Menon, Narosa PublishingHouse.
8. Advanced Structural Analysis by A.K.Jain, Nem Chand &Bros.

PROFESSIONAL ELECTIVE – III
B) INTRODUCTION TO COMPOSITE MATERIALS
VI SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

- To Study the properties of Composite Laminate and its macro mechanical analysis
- To study the behavior of glass fiber reinforced laminates.
- To design GRP box beams and stressed skinned roof structures.

Course Outcomes:

After the completion of the course the student will be able to

- Acquire the knowledge about the composite laminate, glass fiber reinforced laminate and their strength characteristics
- Develop skills in design of GRP box beams & Stressed skinned roof structure.

UNIT – I

Introduction: Requirements of structural materials, influence of nature of materials in structural form, Nature of structural materials- Homogeneous materials, composite materials.

UNIT – II

Macro mechanical Properties of composite Laminate: Introduction, Assumptions and Idealizations, Stress Strain relationships for composite Laminate- Isotropic, Orthotropic laminate, Strength Characteristics- Basic concepts, Strength hypothesis for isotropic and Orthotropic laminate. Macro mechanical Analysis of composite Laminate: Introduction, Assumptions and Limitations, Stiffness characteristics of glass reinforced laminate- Stress- Strain relationships in continuous, discontinuous fiber laminate, Strength characteristics of glass reinforced laminate- Strengths in continuous, discontinuous fiber laminate.

UNIT – III

Behaviour of Glass Fibre-Reinforced laminates: Introduction, Stiffness characteristics of Laminated composites- Behaviour of Laminated beams and plates, Strength characteristics of Laminated composites- Strength analysis and failure criteria, Effect of inter laminar structures. Glass Reinforced Composites: Introduction, Continuously reinforced laminates- uni- directionally and multi directionally continuously reinforced laminates, discontinuously reinforced laminates – Stiffness and Strength properties

UNIT – IV

GRP properties relevant to structural Design: Introduction, Short-term strength and stiffness- Tensile, Compressive, Flexural and Shearing. Long term strength and stiffness properties, Temperature effects, Effect of fire, Structural joints- Adhesive, mechanical, Combinational, Transformed sections.

UNIT – V

Design of GRP Box Beams: Introduction, loading, span and cross-sectional shape, Selection of material, Beam manufacture, Beam stresses, Experimental Behavior, Effect on Beam performance- Modulus of Elasticity, Compressive Strength, I value, prevention of compression buckling failure, Behavior under long term loading.

Text book

1. GRP in Structural Engineering M.Holmes and D.J.Just.
2. Mechanics of Composite materials and Structures by Madhujith Mukhopadhyay; Universities Press

PROFESSIONAL ELECTIVE – III

C). ADVANCED STRUCTURAL ENGINEERING

VI SEMESTER

Lecture:2 Tutorial:1		Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- Familiarize Students with Raft Foundations and combined Footing
- Familiarize Students with different types of Retaining walls
- Equip student with concepts of Industrial structures and different loads on industrial structures
- Understand Concepts of flat slabs

Course Outcomes:

At the end of this course the student will be able to

- Design raft foundations and different types of foundations
- Carryout analysis and design of different types of RCC retaining walls
- Solve the problems design of RCC flat Slab,
- Understand various loads acting and design of Industrial truss building members.
- Understand basics of Earthquake on structures, Seismic forces acting on structure.

SYLLABUS:

UNIT – I Analysis and Design of Combined footing and Raft Foundations

UNIT – II Analysis and Design of Flat Slabs- Direct Design and Equivalent Frame Methods- Check for Punching shear

UNIT – III Retaining Walls- forces acting on retaining wall- stability requirement- Design of RCC Cantilever Retaining walls, Counterfort retaining wall

UNIT – IV Design of Industrial Structures; Types of roof trusses - loads on trusses – wind loads - Purlin design – truss design.

UNIT-V Introduction to Earthquake Engineering- Cyclic behavior of concrete and reinforcement-significance of ductility-ductility of beam-Detailing for ductility- Simple problems based on Centre of mass and Centre of stiffness-Computation of earthquake forces on building frame using seismic Coefficient method as per IS1893:2002

Text books:

1. Reinforced Concrete Structures' Vol-2, B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
2. Reinforced Concrete Structures, N. Subrahmanian, OxfordPublishers
3. Design Drawing of Concrete and Steel Structures, N. Krishna Raju University Press 2005.
4. A. K. Chopra. Dynamics of structure theory and applications to earthquake engineering, prentice Hall of India, 2008.

References:

1. Reinforced concrete design, S. U, Pillai and D. Menon, Tata Mc.Grawhill Publishing Company

Codes: Relevant IS: codes.

INTERNAL EXAMINATION PATTERN:

The total internal marks (30) are distributed in three components as follows:

1. Descriptive (subjective type) examination : 25marks
2. Assignment : 05marks

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is60%.

PROFESSIONAL ELECTIVE – III

D). AIR POLLUTION AND CONTROL

VI SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

COURSE OBJECTIVES:

The objective of the teacher is to impart knowledge and abilities to the students to:

- Understand the basic concepts of air pollution and its effects on human and ecosystem health
- Explore how atmospheric chemical composition both drives and responds to changes in the earth system, including climate change.
- Look at the major air pollutants, their sources, chemical transformations in the atmosphere and impacts.
- Know how to interpret meteorological data for atmospheric stability and air pollutant transport and dispersion
- Get an insight into the fundamentals of some of the most widely used commercial and freely available air quality models
- Present detailed information about the design characteristics of technology for particulate matter control, including electrostatic precipitators, fabric filters, cyclones, spray towers and Venturi washers.

Unit – I

Introduction - Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary air pollutants, Point, Line and Areal Sources of air pollution – Stationary and mobile sources. Effects of Air pollutants on man, material and vegetation; Global effects of air pollution – Green House effect, carbon credits, Heat Island, Acid rains, Ozone Holes etc.

Unit – II

Basic Atmospheric Properties - Meteorology and plume Dispersion-windrose diagram; Properties of atmosphere; Heat, Pressure System, Winds and moisture, plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

Unit – III

Control of Particulates - Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's – setting chambers, cyclone separators, back filters, Dry and Wet scrubbers, Electrostatic preceptor

Unit – IV

Control of Gaseous Emissions- Control of gaseous emissions – General Methods of control of NOx and SOx emissions – In plant Control Measures, process changes, dry and wet methods of removal and recycling – Adsorption – Absorption – Combustion-incinerators-flares.

Unit - V

Air Quality Index – Monitoring of SPM-PM10 &PM2.5, SOx; NOx and CO Emission standards – Air sampling – Sampling Techniques – High volume air sampler – stack sampling – Analysis of Air pollutants- Air quality standards – Air pollution control act.

Textbooks:

1. Air Pollution and Control, K.V.S.G. Murali Krishna, Laxmi Publications, New Delhi, 2015
2. Metcalf & Eddy, "Wastewater engineering Treatment disposal reuse", Tata McGraw Hill.
3. Air pollution By Wark and Warner – Harper & Row, New York. Reference Books: 1. M.N. Rao and Dutta – Industrial Waste.
4. Mark J. Hammer, Mark J. Hammer, Jr., "Water & Wastewater Technology", Prentice Hall of India.
5. N.L. Nemerrow –Theories and practices of Industrial Waste Engineering.
6. C.G. Gurnham –Principles of Industrial Waste Engineering

PROFESSIONAL ELECTIVE - IV

A). TRANSPORTATION ENGINEERING – II

VI SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objectives of this course are:

- To know various components and their functions in a railway track
- To acquire design principles of geometrics in a railway track.
- To acquire design principles of airport geometrics and pavements.

Course Outcomes:

At the end of course, Student will be able to

- Design geometrics in a railway track.
- Design airport geometrics and airfield pavements.

SYLLABUS:

A. RAILWAY ENGINEERING

UNIT – I Components of Railway Engineering: Permanent way components – Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.

UNIT – II Geometric Design of Railway Track: Alignment – Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves.

UNIT – III Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signaling systems – Mechanical signaling system – Electrical signaling system – System for Controlling Train Movement – Interlocking – Modern signaling Installations.

B. AIRPORT ENGINEERING

UNIT – IV Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

UNIT – V Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface drainage.

TEXT BOOKS:

1. Railway Engineering, Satish Chandra and Agarwal M. M., Oxford University Press, New Delhi
2. Airport Engineering, Khanna & Arora - Nemchand Bros, NewDelhi.

REFERENCES:

1. Railway Engineering, Saxena & Arora – Dhanpat Rai, NewDelhi.
2. Transportation Engineering Planning Design, Wright P. H. & Ashfort N. J., John Wiley & Sons.
3. Transportation Engineering Volume II, C Venkatramaiah, 2016, Universities Press, Hyderabad.
4. Transportation Engineering, Railways, Airports, Docks & Harbours, Srinivasa Kumar R, University Press,Hyderabad
5. Airport Engineering Planning & Design, Subhash C. Saxena, 2016, CBS Publishers, New Delhi.
6. Highway, Railway, Airport and Harbor Engineering, Subramanian K. P, Scitech Publications (India) Pvt Limited,Chennai
7. Airport Engineering, Virendra Kumar, Dhanpat Rai Publishers, NewDelhi.

PROFESSIONAL ELECTIVE - IV
B). ADVANCED SURVEYING

VI SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Objective:

To understand the use of Astronomy, Photogrammetry, Total Station and GPS

Course outcomes:

On completion of this course, the student shall be able to

- Know the Astronomical Surveying
- Do the Photogrammetric Surveying and Interpretation
- Solve the Field Problems with Total Station
- Know the GPS Surveying and The Data Processing
- Understand the Route Surveys and Tunnel Alignments

UNIT I - ASTRONOMICAL SURVEYING

Astronomical terms and definition – Motion of sun and stars – Celestial co-ordinate System - Time system - Nautical Alamance – Apparent attitude and corrections – Field observations and determinations of time, longitude, latitude and azimuth by attitude and Hour angle method.

UNIT II - AERIAL SURVEYING

Terrestrial Photogrammetry – Terrestrial stereo photogrammetry – Aerial photogrammetry – overlaps – scale of photographs – Vertical and titled photographs distortion in aerial photographs – stereostopic vision - photo interpretation – Applications.

UNIT III - TOTAL STATION SURVEYING

Classification – basic measuring and working principles of an Electro – optical and Microwave total station- sources of errors in Electro – optical and Microwave total station – Care and Maintenance of total station – trilateration – Applications.

UNIT IV - GPS SURVEYING

Basic concepts – Space, Control and User segments – Satellite configuration – Signal structure – Orbit determination and representation – Anti spoofing and selective availability – hand held and geodetic receivers – Field work procedure – Data processing Applications.

UNIT V - MISCELLANEOUS

Reconnaissance – Rout surveys for highways, railways and waterways – simple, compound, reverse transition and vertical curve – setting out methods - hydrographic surveying – tides – MSL – Sounding methods – measurement of current and discharge – Tunnel alignment and setting out – Settlement and Deformation studies.

TEXT BOOKS:

1. James M.Anderson and Edward M.Mikhail, " Surveying, Theory and Practice", 7 th Edition, McGraw Hill, 2001.
2. Bannister and S.Raymond, "Surveying", 7th Edition, Longman 2004.
3. Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3rd Edition, 2004.
4. Laurila, S.H. Electronic Surveying in Practice, John Wiley and Sons Inc, 1993.

REFERENCES:

1. Roy S.K., "Fundamentals of Surveying", 2nd Edition, Prentice Hall of India, 2004.
2. Arora K.R. "Surveying Vol I & II", Standard Book House, 10th Edition 2008.
3. Guocheng Xu, GPS Theory, Algorithms and Applications, Springer – Verlag, Berlin, 2003.
Seeber G, Satellite Geodesy, Water De Gruyter, Berlin,1998

PROFESSIONAL ELECTIVE – IV

C). GROUND WATER DEVELOPMENT AND MANAGEMENT

VI SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Outcomes:

At the end of the course, the student will be able to Understand Ground Water occurrence, Ground Water Movement Well constructional etc.

UNIT-I: Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT–II: Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.

UNIT – III: Steady groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theim's equations, Assumptions, Formation constants, yield of an open well Well interface and well tests – Recuperation Test. Unsteady flow towards a well – Non equilibrium equations – Theis' solution – Jocob and Chow's simplifications, Leaky aquifers – Well Interference.

UNIT – IV: Well Design: Water well design-well diameter, well depth, well screen-screen length, slot size, screen diameter and screen selection, design of collector wells, infiltration gallery. Well Construction and Development Water wells, drilling methods-rotary drilling, percussion drilling, well construction, well development, well completion, well disinfection, well maintenance.

UNIT – V: Groundwater: Modelling and Management Basic principles of groundwater modelling- Analog models-viscous fluid models and membrane models, digital models-Finite difference and finite element models, Concepts of groundwater management, basin management by conjunctive use-case studies.

TEXT BOOKS:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H. M. Raghunath, Wiley Eastern Ltd.
3. Ground Water Hydrology by D.K. Todd and L.R Mays John Willey.

REFERENCES:

1. Groundwater Hydrology by Bower, John Wiley & sons.
2. Groundwater System Planning & Management – R. Willes & W. W. G. Yeh, Prentice Hall.

PROFESSIONAL ELECTIVE – IV

D). GEOSYNTHETICS

VI SEMESTER

Lecture:2	Tutorial:1	Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

The objective of this course is:

1. Understand history and various manufacturing methods of geosynthetics.
2. Know Properties and Testing methods of Geosynthetics.
3. To design geotextiles.
4. To design geogrids.
5. Uses of Geomembranes in various Constructions.
6. To learn Advantages of Geo composites

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Testing methods of Geosynthetics**.**
2. Design geo textiles.
3. Design geogrids.
4. Using Geomembranes in various constructions.
5. Using Geocomposites in various constructions.

SYLLABUS

UNIT – I: Introduction

Introduction to Geosynthetics – Basic description – History – Manufacturing methods – Uses and Applications.

UNIT – II: Geotextiles

Designing for Separation – Reinforcement – Stabilization – Filtration – Drainage and Moisture barriers. Properties and Testing methods of Geotextiles.

UNIT – III: Geogrids

Designing for Reinforcement – Stabilization – Designing Gabions – Construction methods – Design of retaining walls. Properties and Testing methods of Geogrids.

UNIT- IV: Geomembranes

Survivability Requirements – Pond Liners – Covers for Reservoirs – Canal Liners – Landfill Liners – Caps and closures – Dams and Embankments. Properties and Testing methods of Geomembranes.

UNIT- V: Geocomposites

Geocomposites – An added advantage – Geocomposites in Separation – Reinforcement– Filtration – Geocomposites as Geowebs and Geocells – Sheet drains – Strip drains and Moisture barriers. Properties and Testing methods of Geocomposites.

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TEXT BOOKS:

1. "Engineering with Geosynthetics", by G. Venkatappa Rao and GVS Suryanarayana Raju – Tata McGraw Hill Publishing Company Limited – New Delhi.

REFERENCE BOOKS:

1. "Designing with Geosynthetics by Robert M. Koerner Prantice Hall, Eaglewood cliffs, NJ 07632.

2. "Construction and Geotechnical Engineering using Synthetic Fabries" by Robert M. Koerner and Josoph P. Welsh. John Willey and Sons, New York. 3. "Foundation Analysis and Design" by J.E. Bowles McGraw Hill Publications.

OPEN ELECTIVE-1

A) BASICS OF CIVIL ENGINEERING

VI SEMESTER

Lecture: 2	Practical: 0	Internal Marks:30
Credits: 2	Tutorial: 0	External Marks: 70

Course Objectives:

The objective of this course is:

1.Understand the civil engineering materials and their properties
2.To know the importance of surveying and transportation
3.To understand the traffic characteristics and know about sign boards
4.To understand the importance of soil mechanics and its properties
5.To know about the types of buildings and structural components in buildings
6.To know about global water resources and water quality characteristics

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1.To identify various Engineering materials and their properties.
2.Application of surveying and transportation in field.
3.Application of Soil mechanics in various soil conditions.
4.Able to Identify Different structural components and their necessity
5.Able to understand canal irrigation system
6.To understand drinking water quality importance and various characteristics that changes water quality.

Unit-1: Introduction to Civil Engineering and Civil Engineering Materials

Introduction, Branches, Scope, Impact, Role of Civil Engineer, List of materials, Details (types, properties, uses) of materials: Cement, Aggregate, Brick, Steel, Concrete, Stone, Soil, Mortar, Timber, Plastic, Flyash, Steel slag, Copper slag, Bitumen.

Unit –II: Introduction to Surveying and Transportation: Introduction and Fundamental principles of surveying. Applications of Surveying, types & different methods of surveying Intro duction to Linear measurements, Angular Measurements. Leveling, Introduction to GPS, GIS & RS

Transportation: Role of Transportation, Modes, Road types & Patterns, Traffic characteristics, signs & sign boards

Unit –III: Introduction to Soil Mechanics Origin of soils – Types & classification, Application of soil mechanics, Soil formation, soil structure and clay mineralogy, adsorbed water, mass volume relationship, relative density, Introduction to soil properties- Compaction, consolidation, strength parameters

Unit –IV: Introduction to Buildings and structures: Building Construction: Types of building, Components of building & its functions, types of loads acting on building, **Structures:** Types of beams, stability conditions, types of reinforced concrete beams and their applications

Unit –V: Introduction to water resources and Environment: Global Water resources, hydrological cycle, losses, storage, irrigation structures, canal irrigation system. Water source and waste water quality characteristics, drinking water standards.

TEXT BOOKS

1. Building Materials, B. C. Punmia, Laxmi Publications private ltd.
2. Surveying, Vol No.1, 2 &3, B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jai Laxmi Publications Ltd, New Delhi.
3. Highway Engineering, Khanna S. K., Justo C. E. G and Veeraragavan A, Nem ChandBros., Roorkee.
4. Soil Mechanics and Foundation Engineering, V. N. S. Murthy, CBS publishers
5. Strength of Materials by S. Ramamrutham
6. Irrigation and Water Power Engineering, B. C. Punmia, Pande B. B. Lal, Ashok Kumar Jain and Arun Kumar Jain, Lakshmi Publications (P) Ltd.
7. Elements of Environmental Engineering, K. N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

REFERENCE BOOKS

1. Building Materials, P. C. Verghese, PHI learning (P) ltd.
2. Text book of Surveying, Arora (Vol No. 1), Standard Book House, Delhi.
3. Fundamentals of Soil Mechanics, D. W. Taylor, Wiley.
4. Strength of Materials by R.K Bansal, Lakshmi Publications

OPEN ELECTIVE – I
(B).Sustainable Engineering Practices

VI SEMESTER

Lecture: 2 Practical: 0	Internal Marks:30
Credits: 2 Tutorial: 0	External Marks: 70

Course Objectives: The objective of this course is:

1. To learn the rain water saving importance & Rainwater harvesting techniques
2. To learn the waste processing techniques & various composting methods.
3. To learn about waste water recycling and its importance
4. To gain some knowledge about Biogas Plants.
5. To review some experimental studies on Waste Recycling in Educational Institutions

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Able to implement Various Rainwater harvesting techniques
2. Able to implement various composting methods.
3. Understand the water importance and necessity of recycling.
4. Design of biogas production units.
5. Student can be able to recycle the waste from educational institutions.

SYLLABUS:

Unit1: Rainwater harvesting

Principles of water harvesting, Necessity of Rain water harvesting, Importance of Rain water harvesting, Rain water harvesting methods, Design; Check dams, Nala / Gully plugging, Percolation tank, Khet-talawadi - Roof top harvesting - design - Vegetation and plantation, Design; Case Studies

Unit 2: Waste processing techniques

Composting**;** use of composting, principles of composting process, Factors effecting, Composting challenges – composting and its methods, Vermi-composting, Waste to energy techniques, Wealth from waste Landfill; Case studies.

Municipal solid waste in Indian conditions, legal aspects of solid waste disposal, Plastic waste disposal.

Unit 3: Recycling of wastewater

History of Wastewater Reuse, Motivational Factors for Recycling/Reuse, Quality Issues of Wastewater Reuse/Recycling, Types of Wastewater Reuse, Future of Water Reuse. Case studies.

Unit 4: Biogas Plants

Bio - gas generation and purification technology, performance evaluation of biogas as vehicle fuel, environmental pollution with conventional and alternate fuels. Design of bio-fuel production units: bio-gas plants.

Unit 5: Waste Recycling in Educational Institutions

Waste Water Recycling and Solid Waste Management in Educational Institutions-Case studies

TEXT BOOKS & REFERENCES:

1. Watershed Management Murthy, J. V. S., New Age International Publishers, 1998
2. Grewal NS, Ahluwalia S, Singh S & Singh G. 1997. Hand Book of Biogas Technology
3. Biomass Systems: Principles & Applications. New Age International Odum HT & Odum EC. 1976.
4. Solid waste management by K. Sasikumar and Sanoop Gopi
5. https://www.researchgate.net/publication/328738824
6. S.Vigneswaran, M.Sundaravadivel, (2004), RECYCLE AND REUSE OF DOMESTIC WASTEWATER, in Wastewater Recycle, Reuse and Reclamation, [Ed. Saravanamuthu (Vigi) Vigneswaran], in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford ,UK, [http://www.eolss.net]

OPEN ELECTIVE – II
(A).DISASTER MANAGEMENT

VI SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives

The objective of this course is:

- Develop an understanding of why and how the modern disaster management is involved with pre-disaster and post-disaster activities.
- Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.
- Understand the 'relief system' and the 'disaster victim.'
- Describe the three planning strategies useful in mitigation.
- Identify the regulatory controls used in hazard management.
- Describe public awareness and economic incentive possibilities.
- Understand the tools of post-disaster management.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

- Understand Modern disaster management involved with pre-disaster and post-disaster activities.
- Able to Develop Various awareness based on the current situation.
- Able to plan mitigation strategies for various disasters.
- Identify Regulatory controls and understand various tools of post-disaster management.

SYLLABUS

UNIT-I: Natural Hazards and Disaster Management: Introduction of DM – Inter disciplinary - nature of the subject– Disaster Management cycle – Five priorities for action, Agencies involved in Disaster Management. Case study of the following: floods, Earthquakes, global warming & Tsunamis – Post Tsunami hazards along the Indian coast – landslides.

UNIT-II: Man Made Disaster and Their Management Along with Case Study Methods of The Following: Fire hazards – transport hazard dynamics – solid waste management – bio terrorism -threat in mega cities, rail and air crafts accidents, and Emerging infectious diseases and their management.
Impact of disaster on poverty and deprivation- Climate change adaptation and human health - Exposure, Forest management and disaster risk reduction

UNIT-III: Risk and Vulnerability: Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster.

UNIT-IV: Role of Technology in Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – roads and bridges- mitigation programme for earth quakes, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training- transformable indigenous knowledge in disaster reduction.

UNIT-V: Education and Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management.

TEXT BOOKS

1. 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy(2009),Universities press.
2. 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt. Ltd.

REFERENCE BOOKS

1. 'Disaster Management' edited by H K Gupta (2003), Universities press.

OPEN ELECTIVE – II

(B).LOW COST HOUSING

VI SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:

The objective of this course is:

1. To learn about Urban housing and Rural housing scenarios in India
2. To learn about Living conditions and planning for housing in urban Land
3. To learn about prefabrication technologies and its adaptation in India
4. To know about Low infrastructure services and Rural Housing.
5. To look over the housing techniques in disaster prone areas.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Able to analyze various Urban housing and Rural housing scenarios in India.
2. Able to plan housing conditions in urban and rural housing scenarios.
3. Application of prefabrication technologies for efficient housing in India.
4. Efficient construction of Earthquake resistant buildings

SYLLABUS

UNIT – I

Housing Scenario: Introduction, Status of urban housing, Status of Rural Housing

Housing Finance: Introduction, Existing finance system in India, Government role as facilitator, Status at Rural Housing Finance.

UNIT - II

Land use and planning for housing: Introduction, Planning of urban land, Urban land ceiling and regulation act, Efficiency of building bye laws, Residential Densities

Housing of the urban poor: Introduction, Living conditions in slums, Approaches and strategies for housing urban poor.

UNIT – III

Development and Adopt on Low Cost Housing Technology

Adoption of innovative cost effective construction techniques, Adoption of precast elements in partial prefabrication, Adopting of total prefabrication of mass housing in India, General remarks on pre cast rooting/flooring systems, Economical wall system, Single Brick thick loading bearing wall, Fly ash & gypsum for masonry, Adoption of precast R.C. plank and join system for roof/floor in the building.

UNIT – IV

Alternative Building Materials for Low Cost Housing: Substitution for scarce materials, Ferro cement, Gypsum boards, Timber substitutions, Industrial wastes, Agricultural wastes.

Low Cost Infrastructure Services Current status, Technological options, Low cost sanitation's, Domestic wall, Water supply energy.

Rural Housing: Introduction, traditional practice of rural housing continuous, Mud Housing technology, Mud roofs, Characteristics of mud, Fire resistant treatment for thatched roof, Soil stabilization, Rural Housing programs.

UNIT – V

Housing in Disaster Prone Areas: Earthquake- Damages to houses, Traditional Houses in disaster prone areas- Type of Damages in non-engineered buildings, Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions, Requirements of structural safety of thin precast roofing units against, Earthquake forces, Status of R&D in earthquake strengthening measures, Floods, cyclone, future safety.

TEXTBOOKS

1. Building materials for low –income houses – International council for building research studies and documentation.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Low cost Housing – G.C. Mathur.

REFERENCES

1. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.
2. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.

ARCHITECTURAL PLANNING and CAD LAB

VI SEMESTER

Lecture: 0 Practical: 3	Internal Marks : 40
Credits:1.5	External Marks : 60

Course Objectives:

- To introduce the fundamentals of Civil Engineering drafting and drawing.

Course Outcomes:

- At the end of the course, the student will be able to Student can draft various structures.
- Prepares standard drawings for Municipal approval.

List of Experiments:

1. Employ CAD software commands to prepare Geometric Constructions and drawings related to Building components.
- Draw conventional signs as per I.S. standards, symbols used in civil engineering drawing.
- Draw the important joinery components of the building like elevation of fully paneled double leaf door, elevation of partly glazed and partly paneled window.
- Draw the important building components like section of a load bearing Wall foundation to parapet.

2. Residential buildings

- Plan, Elevation, Section of single roomed building
- Single storied load bearing type residential building
- Single storied framed structure type residential building

3. Detailing of structural drawings

- Detailing of reinforcement in Cantilever, Simply supported and Continuous Beams (Both Singly & Doubly Reinforced Beams)
- Detailing of reinforcement in RC isolated footings square, rectangular, circular and combined footings.

4.0 Drawings to be submitted for approval to corporation or municipality showing required details in one sheet such as

- Plan – Showing Dimensions of all rooms
- Section – showing Specifications and Typical Foundation Details
- Elevation
- Site Plan – Showing Boundaries of Site and Plinth Area, Car Parking, Passages
- Key plan – Showing the location of Building
- Title Block – Showing signature of Owner & Licensed surveyor

REFERENCES

- Civil engineering drawing by Chakraborthy

TRANSPORTATION ENGINEERING LAB

VI SEMESTER

Lecture: 0	Practical: 3	Internal Marks	:40
Credits:1.5		External Marks	:60

Course Learning Objectives :

• To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.
• To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.
• To test the stability for the given bitumen mix
• To carry out surveys for traffic volume, speed and parking.

LIST OF EXPERIMENTS:

Experiments to be conducted on following materials and should determine the corresponding values.

I. ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.
5. Stripping Test
6. Viscosity Test.

III. BITUMINOUS MIX:

1. Marshall Stability test.

IV. TRAFFIC SURVEYS:

1. Traffic volume study at mid blocks.
2. Spot speed studies.

LIST OF EQUIPMENT REQUIRED:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval's Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Viscometer.
11. Marshal Mix design apparatus.
12. Enoscope for spot speed measurement.
13. Stop Watches

Text Books:

1. Highway Material Testing Manual, S. K. Khanna, C. E. G Justo and A. Veeraraghavan, Neam Chan Brothers New Chand Publications, New Delhi.

Reference Books:

1. I R C Codes of Practice
2. Asphalt Institute of America Manuals
3. Code of Practice of B.I.S.

VII

SEMESTER

SYLLABUS

ESTIMATION, COSTING AND VALUATION

VI SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The subject is designed to provide knowledge

- About process of estimations required for various work in construction.
- Of using SOR & SSR for analysis of rates on various works

Course Outcomes:

By the end of successful completion of this course, the students will be able to:

- Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.
- Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
- Understand how competitive bidding works and how to submit a competitive bid proposal.

SYLLABUS:

UNIT-I: METHODS OF BUILDING ESTIMATES: Introduction, Main items of work, Deduction for openings, Degree of accuracy; Units of measurement. Individual wall method; Centre line method; comparison

UNIT – II: ESTIMATE OF BUILDING: Estimate of RCC framed residential building with footings

ESTIMATE OF RCC WORKS AND ROAD ESTIMATE: Standard hooks and cranks; RCC beam; Estimate of earthwork; Estimate of earthwork of road from longitudinal sections

UNIT – III: CANAL ESTIMATE: Earthwork in canals, Estimate of earthwork in irrigation channel both in banking and cutting.

SPECIFICATIONS: Purpose and method of writing specifications; Detailed Specifications for Brick work; R.C.C work; Plastering;

UNIT – IV: ANALYSIS OF RATES: Task or out - turn work; Labour and materials required for different works; Rates of materials and Labour; Preparing analysis of rates for the following items of work: RCC slab Works, Brick work in super structure.

UNIT–V: PWD ACCOUNTS AND PROCEDURE OF WORKS: Organization of Engineering department; Contract; Tendering; Tender notice; Earnest money; Reverse Tendering; Security money; Measurement book; Revised Estimate; Supplementary estimate, Bidding.

VALUATION OF BUILDINGS: Introduction, Methods of valuation; Out goings; Depreciation; Gross income; Net income; Scrap value; Salvage value; Obsolescence; sinking fund, Capitalized value; Years purchase; Methods of depreciation; Valuation of building based on rents

Text Books:

1. Dutta, B.N, Estimating & Costing in Civil Engineering, U. B. S., NDLS, 2016.
2. Rangwala, Estimating, Costing & Valuation, Universal, NDLS, 2017.

Reference Books:

1. D. D. Kohli and R. C. Kohli., Estimating and Costing, S. Chand Publications, New Delhi-2013
2. Chakrborthy, M. Estimating & costing, Valuations, NDLS, 2012.

PROFESSIONAL ELECTIVE – V

(A)WATER RESOURCES ENGINEERING–II

VII SEMESTER

Lecture:3	Tutorial: -0	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The course is designed to

- Introduce the types, concepts of planning and design of irrigation systems
- Discuss about irrigation projects of India
- Discuss the relationships between soil, water and plant and their significance in planning an irrigation system
- Understand design methods of erodible and non-erodible canals
- Know the principles of hydraulic structures on permeable foundations
- Know the concepts for analysis of storage and diversion head works

Course Outcomes

At the end of the course the student will be able to

- Estimate irrigation water requirements
- Design irrigation canals and canal network and can plan an canal irrigation system
- Find the capacity of a reservoir
- Analyze stability of gravity dams
- Apply suitable spillways and energy dissipation works

SYLLABUS:

UNIT-I Irrigation: Necessity and importance; Terminology of Irrigation and Irrigation structures; Major Irrigation projects in India– Polavaram, Nagarjuna sagar, Kaleswaram, Bakranangal ; Principal crops and crop seasons of India; Types of irrigation and methods of applying water to crops ; Recent irrigation technologies

Crop Water Requirement: soil-water-plant relationship, soil moisture constants, consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, Time factor, Crop ratio, Overlap allowance, Irrigation efficiencies. irrigation efficiencies;

UNIT-II Assessment of Irrigation water: Water Logging; Land Reclamation; Standards of Irrigation water

Canals: Classification, canal alignment, lining of irrigation canals, types of lining design of lined canals; Silting and scouring; Silt theories-Kennedy's silt theory and Lacey's regime theory, Application of Kennedy's and Lacey's theory to channel design, comparison

UNIT-III Canal Structures: Definition and usage of Canal Falls, Regulators, Cross Drainage Works**,** Outlets; Cross Drainage Works-Types, selection; Basic design principles of canal structures

Diversion Head Works: Types of diversion head works, weirs and barrages, layout of diversion head works, components. Causes and failures of weirs on permeable foundations, Bligh's creep theory, design of impervious floors for subsurface flow, exit gradient.

UNIT-IV Reservoir Planning: Investigations, site selection, zones of storage, yield and storage capacity of reservoir. Mass inflow curve and demand curve; Calculation of reservoir capacity for a specified yield from the mass inflow curve; Determination of safe yield from a reservoir of a given capacity; Life of reservoir
Dams: Types of dams, selection of type of dam, selection of site for a dam.

UNIT-V
Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile, limiting height of a dam, stability analysis, drainage galleries
Spillways: Types, types of spillway crest gates. Energy dissipation below spillways-stilling basin and its appurtenances.

Text Books:
1. Irrigation and Water Power Engineering, B. C. Punmia, Pande B. B. Lal, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications (P) Ltd.
2. Irrigation Engineering and Hydraulic Structure, Santosh Kumar Garg, Khanna Publishers.

References:
1. Irrigation and Water Resources Engineering, Asawa G L (2013), New Age International Publishers
2. Irrigation Water Resources and Water Power Engineering, Modi P N (2011), Standard Book House, New Delhi

PROFESSIONAL ELECTIVE – V

(B) DESIGN AND DRAWING OF IRRIGATION STRUCTURES

VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:
To understand design principle of various irrigation structures

Course Outcomes:
At the end of the course the student will be able to design various irrigation structures.

SYLLABUS:
Design and drawing of

1. Surplus weir
2. Tank sluice with a tower head
3. Canal drop-Notch type
4. Canal regulator
5. Under tunnel
6. Syphon aqueduct type III

Final Examination pattern: Any two question of the above six designs may be asked out of which the candidate has to answer one question. The duration of the examination is three hours.

Text Books:
1. Water Resources Engineering – Principles and Practice by C. Satyanarayana Murthy, New age International Publishers.

Reference:
1. Irrigation Engineering and Hydraulic Structures, S. K. Garg, Standard Book House.
2. Irrigation and Water Power Engineering, B. C Punmia & Lal, Lakshmi Publications Pvt. Ltd., New Delhi.

PROFESSIONAL ELECTIVE – V

(C).ADVANCED FOUNDATION ENGINEERING

VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- To enable the student to appreciate how Meyerhof's general bearing capacity equations are important over Terzaghi's bearing capacity equation.
- To teach the student special methods of computation of settlements and the corrections to be applied to settlements.
- To enable the student to understand the advanced concepts of design of pile foundations.
- To enable the student to learn the difference between isolated and combined footings, the determination of bearing capacity of mats and proportioning of footings.

Course Outcomes:

Upon successful completion of this course, student will be able to

- Compute the safe bearing capacity of footings subjected to vertical and inclined loads.
- Understand the advanced methods of settlement computations and proportion foundation footings.
- Appreciate the methods of computing the pull-out capacity and negative skin friction of piles and compute the settlements of pile groups in clays.
- Appreciate the difference between isolated footings and combined footings and mat foundations.

SYLLABUS:

UNIT-I Bearing capacity of Foundations using general bearing capacity equation – Meyerhof's, Brinch Hansen's and Vesic's methods- Bearing capacity of Layered Soils: Strong layer over weak layer, Weak layer on strong layer – Bearing capacity of foundations on a top of slope – Bearing capacity of foundations at the edge of the slope.

UNIT-II Settlement analysis: Immediate settlement of footings resting on granular soils – Schmertmann & Hartman method – De Beer and Martens method - Immediate settlement in clays – Janbu's method – correction for consolidation settlement using Skempton and Bjerrum's method – Correction for construction period.

UNIT-III Mat foundations – Purpose and types of isolated and combined footings – Mats/ Rafts – Proportioning of footings – Ultimate bearing capacity of mat foundations – allowable bearing capacity of mats founded in clays and granular soils – compensated rafts.

UNIT-IV Earth-retaining structures – cantilever sheet piles – anchored bulkheads – fixed and free earth support methods – design of anchors – braced excavations – function of different components – forces in ties – stability against bottom heave.

UNIT-V Pile foundations – single pile versus group of piles – load-carrying capacity of pile groups – negative skin friction (NSF) -settlement of pile groups in sands and clays – laterally loaded piles in granular soils – Reese and Matlock method – laterally loaded piles in cohesive soils – Davisson and Gill method – Broms' analysis.

Text Books:

1. Principles of Foundation Engineering, BM Das, CENTAG Learning 2. Soil Mechanics and Foundation Engineering, VNS Murthy, CBS Publishers

Reference:

1. Foundation Analysis and Design, J.E. Bowles, John Wiley 2. Foundation Design, W.C. Teng, Prentice Hall Publishers

PROFESSIONAL ELECTIVE – V

(D).SOLID WASTE MANAGEMENT

VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste
- To acquire the principles of treatment of municipal solid waste
- To know the impact of solid waste on the health of the living beings
- To learn the criterion for selection of landfill and its design
- To plan the methods of processing such as composting the municipal organic waste

Course Learning Outcomes

Upon successful completion of this course, the students will be able to:

- Design the collection systems of solid waste of a town
- Design treatment of municipal solid waste and landfill
- Know the criteria for selection of landfill
- Characterize the solid waste and design a composting facility
- Know the Method of treatment and disposal of Hazardous wastes.

SYLLABUS:

UNIT- I Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste - Factors Influencing generation of solid waste - sampling and characterization –Future changes in waste composition, monitoring responsibilities, Terms related to ISWM like WTE, ULB, TLV etc. Measurement of NPK and Calorific value.

UNIT- II Basic Elements in Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste Collection of Solid Waste: Type and methods of waste collection systems, analysis of collection system - optimization of collection routes– alternative techniques for collection system.

UNIT- III Transfer, Transport and Transformation of Waste: Need for transfer operation, compaction of solid waste - transport means and methods, transfer station types and design requirements. Unit operations used for separation and transformation: shredding - materials separation and recovery, source reduction and waste minimization

UNIT- IV Processing and Treatment: Processing of solid waste - Waste transformation through combustion and composting. Market yard wastes and warming composting and vermin composting, anaerobic methods for materials recovery and treatment – Energy recovery – bio methanization and cleaning– Incinerators.

Disposal of Solid Waste: Methods of Disposal, Landfills: Site selection, design and operation, drainage and leachate collection systems –designated waste landfill remediation. Case studies.

UNIT- V Hazardous Waste Management: sources, collection, transport, treatment and disposal methods of Hazardous waste; Biomedical waste Management; Electronic waste Management.

Text Books:

1. Integrated Solid Waste Management, George Techo banoglous, McGraw Hill Publication, 1993.
2. Solid and Hazardous Waste management by M.N.Rao, Razia Sultana and Sri Harsha Kota

References: 1. Solid Waste Engineering, Vesilind, P.A., Worrell, W., Reinhart, D., Cenage learning, New Delhi, 2004
2. Hazardous Waste Management, Charles A. Wentz, McGraw Hill Publication, 1995.
3. Solid and Hazardous Waste Management PM Cherry, CBS Publishers and Distributors. New Delhi, 2016.
4. Solid Waste Engineering, William A Worrell, P Aarue Vesilind, Cengage Learning, New Delhi 2016

PROFESSIONAL ELECTIVE – VI
A) ENVIRONMENTAL ENGINEERING – II
VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:
The objective of this course is:
• Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city
• Impart understanding of treatment of sewage and the need for its treatment.
• Summarize the appurtenance in sewerage systems and their necessity
• Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low-cost treatment systems
• Effluent disposal method and realize the importance of regulations in the disposal of effluents in rivers

Course Outcomes:
By the end of successful completion of this course, the students will be able to:
• Plan and design the sewerage systems
• Select the appropriate appurtenances in the sewerage systems
• Analyze sewage and suggest and design suitable treatment system for sewage treatment
• Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river
• Suggest a suitable disposal method with respect to effluent standards.

SYLLABUS:

UNIT – I: Introduction to Sanitation, Systems of sanitation, collection and conveyance of waste water, sewerage – classification of sewerage systems, Estimation of sewage flow and storm water drainage, fluctuations, types of sewers, Hydraulics of sewers and storm drains, design of sewers, appurtenances in sewerage, cleaning and ventilation of sewers. Pumping of wastewater: Pumping stations, components, types of pumps and their suitability with regard to wastewaters.

UNIT – II: House Plumbing: Systems of plumbing, separate and combined-sanitary fittings and other accessories, Design of building drainage. Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations.
Treatment of sewage: Primary treatment, design of preliminary and primary treatment units.

UNIT – III: Secondary treatment: Aerobic and anaerobic treatment process comparison.
Suspended growth process: Activated Sludge Process, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons.
Attached Growth Process: Trickling Filters- classification–design-operation and maintenance problems. RBCs, Fluidized bed reactors

UNIT IV: **Miscellaneous Treatment Methods:** Sewage disposal Methods; Disposal by dilution; Self-purification process; Oxygen sag; Zones of pollution of river; Disposal by irrigation. Septic tank-Design; effluent disposal; Sewage Management, government policies and programs, value chain, environmental aspects, on site contaminant system, waste characterization and treatment options. standards of effluent.
Bio-solids (Sludge) management: Characteristics-SVI, handling and treatment of sludge-thickening – anaerobic digestion of sludge, Sludge Drying Beds. Advanced sewage management practices-zero liquid discharge

UNIT-V:
Air Pollution: Sources and impacts of air pollution, types of pollutants, air pollution control and quality standards, Air Quality Index.
Noise Pollution: Impacts of noise pollution, measurement of noise pollution, permissible limits and control of noise pollution.

Text Books

1. Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, Tata McGraw-Hill edition.
2. Industrial Water and Wastewater Management, K.V.S.G. Murali Krishna.
3. Elements of Environmental Engineering, K. N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

References

1. Environmental Engineering, Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglus – Mc-Graw-Hill Book Company, New Delhi, 1985
2. Wastewater Treatment for Pollution Control and Reuse, Soli. J Arceivala, Sham R Asolekar, Mc-GrawHill, NewDelhi; 3rd Edition
3. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, Garg, S. K., Khanna Publishers
4. Sewage treatment and disposal, P. N. Modi & Sethi.
5. Environmental Engineering, Ruth F. Weiner and Robin Matthews – 4th Edition Elsevier, 2003
Environmental Engineering, D. Srinivasan, PHI Learning Private Limited, New Delhi, 2011.

PROFESSIONAL ELECTIVE – VI

B) THEORY AND APPLICATIONS OF CEMENT COMPOSITES

VII SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives

The objective of this course is:

- Understand behavior of composite materials and also their strain – stress behavior.
- To learn the classification of materials as per orthotropic and anisotropic behavior.
- Understand strain constants using theories which can be applied to composite materials.
- To analyze and design structural elements made of cement composites.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

- Formulate constitutive behavior of composite materials –Ferrocement & Fiber Reinforced Concrete - by understanding their strain- stress behavior.
- Classify the materials as per orthotropic and anisotropic behavior.
- Estimate strain constants using theories applicable to composite materials.
- Analyze and design structural elements made of cement composites.

SYLLABUS

UNIT-I: Introduction: Classification and Characteristics of Composite Materials- Basic Terminology, Advantages. Stress-Strain Relations- Orthotropic and Anisotropic Materials, Engineering Constants for Orthotropic Materials, Restrictions on Elastic Constants, Plane Stress Problem, Biaxial Strength, Theories for an Orthotropic Lamina.

UNIT-II: Mechanical Behaviour: Mechanics of Materials Approach to Stiffness- Determination of Relations between Elastic Constants, Elasticity Approach to Stiffness- Bounding Techniques of Elasticity, Exact Solutions – Elasticity Solutions with Continuity, Halpin, Tsai Equations, Comparison of approaches to Stiffness.

UNIT-III: Cement Composites: Types of Cement Composites, Terminology, Constituent Materials and their Properties, Construction Techniques for Fibre Reinforced Concrete – Ferrocement, SIFCON, Polymer Concretes, Preparation of Reinforcement, Casting and Curing.

UNIT-IV: Mechanical Properties of Cement Composites: Behaviour of Ferrocement, Fiber Reinforced Concrete in Tension, Compression, Flexure, Shear, Fatigue and Impact, Durability and Corrosion.

UNIT-V: Application of Cement Composites: FRC and Ferrocement- Housing, Water Storage, Boats and Miscellaneous Structures. Composite Materials- Orthotropic and Anisotropic behavior, Constitutive relationship, Elastic Constants. Analysis and Design of Cement Composite Structural Elements – Ferrocement, SIFCON and Fiber Reinforced Concrete.

TEXT BOOKS & REFERNCE BOOKS

1. Mechanics of Composite Materials, Jones R. M,, 2nd Ed., Taylor and Francis, BSP Books, 1998.
2. Advanced Concrete Technology –Zongjin Li
3. Ferrocement – Theory and Applications, Pama R. P., IFIC, 1980.
4. New Concrete Materials, Swamy R.N., 1stEd., Blackie, Academic and Professional, Chapman & Hall, 1983.
5. Isaac M. Daniel and OriIshai - Engineering Mechanics of Composite Materials, Oxford University Press, Second Edition, New Delhi.
6. Michael W. Hyer - Stress Analysis of Fiber-Reinforced Composite Materials, WCB/McGraw-Hill, Singapore.
7. Roman Solecki and R Jay Conant – Advanced Mechanics of Materials, Oxford
8. University Press, New York, Special Edition for sale in India.

PROFESSIONAL ELECTIVE – VI

(C).PAVEMENT DESIGN

VII SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 1	External Marks: 70

Course Objectives:
The objective of this course is:
- To know various factors affecting pavement design
- To know various concepts for the stresses in pavements.
- To understand material characterization and mix design concepts.
- To acquire design principles of flexible and rigid pavements.
- To acquire design principles of shoulders- overlays and drainage.

Course Outcomes: At the end of the course- the student will be able to:
- Characterize the response characteristics of soil- aggregate- asphalt- and asphalt mixes
- Analyze flexible pavements
- Analyze rigid pavements
- Design a flexible pavement using IRC- Asphalt Institute- and AASHTO methods
- Design a rigid pavement using IRC- and AASHTO methods

Unit I PAVEMENT MATERIALS: Types and component parts of pavements- highway and airport pavements- Materials used in pavements- basic soil properties relevant to pavement applications- resilient modulus- and modulus of sub-grade reaction- Physical properties of aggregates and blending- Basic properties of bitumen- polymer and rubber modified bitumen- Dynamic modulus- flow time and flow number of bituminous mixes. Cement: chemical composition- types- physical properties. Distresses in flexible and rigid pavements. Use of geosynthetics in pavements.

Unit II STRESSES IN FLEXIBLE PAVEMENTS: layered system concepts- stress solution for one- two- and three-layered systems- fundamental design concepts.

Unit III STRESSES IN RIGID PAVEMENTS: Westergaard's theory and assumptions- stresses due tocurling- stresses and deflections due to loading- frictional stresses- stresses in dowel bars and tie bars.

Unit IV FACTORS AFFECTING PAVEMENT DESIGN: Variables considered in pavement design- Classification of axle types- articulated commercial vehicles- legal axle and gross weights on single and multiple units- tyre pressure- contact pressure- ESWL- EWLF and EAL concepts- Traffic analysis: ADT- AADT- growth factor- lane distribution- directional distribution and vehicle damage factors.

Unit V DESIGN OF FLEXIBLE PAVEMENTS: IRC method of flexible pavement design- Design of flexible pavements for low volume roads using IRC method-
DESIGN OF RIGID PAVEMENTS: IRC methods of rigid pavement design- Design of rigid pavements for low volume roads using IRC method.

TEXTBOOKS:

1.Huang- Y.H. Pavement Analysis and Design- Second Edition- Dorling Kindersley (India) Pvt. Ltd.- New Delhi- India- 2008.

REFERENCES:

1. IRC: 37-2012 Guidelines for the Design of Flexible Pavements- The Indian Roads Congress- New Delhi- India- 2012.
2. IRC: 58-2011 Guidelines for the Design of Plain Jointed Rigid Pavements for Highways- The Indian Roads Congress- New Delhi- India- 2011.

PROFESSIONAL ELECTIVE – VI

(D).REPAIR AND REHABILITATION OF STRUCTURES

VII SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:
The objective of this course is:

- Familiarize Students with deterioration of concrete in structures
- Equip student with concepts of NDT and evaluation
- To evaluate the performance of the materials for repair
- To strategize different repair and rehabilitation of structures.

Course Outcomes: At the end of the course- the student will be able to:

- Explain deterioration of concrete in structures
- Carryout analysis using NDT and evaluate structures
- Students must gain knowledge on quality of concrete
- Examine how the Concrete repair industry equipped with variety of repair materials and techniques

UNIT – I: Maintenance and Repair Strategies
Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration.

UNIT II: Causes of Damage To Structures
Causes of Distress in Structures - Extrinsic and Intrinsic causes for damage of structures; Effect of Chemical and Marine Environment on structures.

UNIT- III: Semi Destructive Tests for Damage Assessment
Core Test, LOK test, CAPO test, Penetration Tests
Non-Destructive Tests for Damage Assessment
Rebound Hammer Test, Ultrasonic Pulse Velocity test, Resistivity Test, Carbonation Test, Corrosion: Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.

UNIT IV: Materials for Repair: Criteria for durable concrete repair, selection of repair materials, Special concretes and mortars, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fiber reinforced concrete, FRP sheets.

UNIT V: Techniques for Repair: Crack repair techniques – Crack Stitching, Mortar and dry pack, vacuum concrete, Shotcreting, Epoxy injection, Mortar repair for cracks
Methods of Strengthening: Repairs to overcome low member strength – Jacketing, blanketing

TEXT BOOKS

1. 'Maintenance & Repair of Civil Structures' by B.L. Gupta & Amit Gupta.
2. 'Rehabilitation of Concrete Structures' by B. Vidivelli, Standard Publishers.
3. 'Concrete Bridge Practice Construction, Maintenance & Rehabilitation' by V. K. Raina

REFERENCES

1. 'Concrete Structures- protection Repair and Rehabilitation' by R. Doodge Woodson, BH Publishers
2. ShettyM.S., "Concrete Technology – Theory and Practice", S.Chand and Company, 2008.
3. Dov Kominetzky.M.S., "Design and Construction Failures", Galgotia Publications Pvt. Ltd., 2001
4. Ravishankar.K., Krishnamoorthy.T.S, "Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures", Allied Publishers, 2004.
5. CPWD and Indian Buildings Congress, Hand book on Seismic Retrofit of Buildings, Narosa Publishers, 2008, Gambhir.M.L., "Concrete Technology", McGraw Hill, 2013

PROFESSIONAL ELECTIVE – VII

A) GEOTECHNICAL ENGINEERING – II

VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
- To enable the student to compute immediate and consolidation settlements of shallow foundations.
- To impart the principles of important field tests such as SPT and Plate bearing test.
- To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

Course Outcomes:

Upon the successful completion of this course:

- The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
- The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.
- The student must be able to use the field test data and arrive at the bearing capacity.
- The student must be able to design Piles based on the principles of bearing capacity.

SYLLABUS:

UNIT – I Shallow Foundations & Settlement analysis:

Bearing Capacity Criteria: Types of foundations and factors to be considered in their location - Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi's theory - IS Methods.

Settlement Criteria: Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

UNIT – II Pile Foundations: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

UNIT-III Well Foundations: Types – Different shapes of well – Components of well – functions – forces acting on well foundations

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – planning of Programme and preparation of soil investigation report.

UNIT –IV Stability of Slopes: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Taylor's Stability Number-Stability of slopes of dams and embankments - different conditions.

UNIT-V Earth Retaining Structures: Rankine's & Coulomb's theory of earth pressure – Culmann's graphical method - earth pressures in layered soils.

Text Books:

1. Principles of Foundation Engineering, Das, B.M., (2011), 6th edition Cengage learning
2. Basic and Applied Soil Mechanics, Gopal Ranjan & A.S.R. Rao, New Age International Pvt. Ltd, (2004).

References:

1. Foundation Analysis and Design, Bowles, J.E., (1988), 4th Edition, McGraw-Hill Publishing Company, Newyork. 2. Analysis and Design of Substructures by Swami Saran, Sarita Prakashan, Meerut.

PROFESSIONAL ELECTIVE – VII

B) BRIDGE ENGINEERING

VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- Familiarize Students with different types of Bridges and IRC standards
- Equip student with concepts and design of Slab Bridges, T Beam Bridges
- Understand concepts of design of Plate Girder Bridges
- Familiarize with different methods of inspection of bridges and maintenance

Course Outcomes:

At the end of this course the student will be able to

- Explain different types of Bridges with diagrams and Loading standards
- Carryout analysis and design of Slab bridges, T Beam bridges and suggest structural detailing
- Carryout analysis and design of Plate girder bridges
- Organize for attending inspections and maintenance of bridges and prepare reports.

SYLLABUS

UNIT-I Introduction- Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, - Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading

UNIT-II Slab bridges- Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Guyon's – Massonet Method –Hendry- Jaegar Methods- Courbon's theory- Pigeaud's method

UNIT-III T-Beam bridges- Analysis and design of various elements of bridge –Design of deck slab, Longitudinal girders, Secondary beams- Reinforcement detailing

UNIT-IV Plate Girder Bridges: Elements of plate girder and their design-web- flange- intermediate stiffener- vertical stiffeners- bearing stiffener- Splices, Design problem with detailing

UNIT-V Sub Structure-Abutments-Stability analysis of abutments-piers-loads on piers-Analysis of piers-Wing Walls-Design problems.

Text Book:

1. Essentials of Bridge Engineering, Jhonson VictorD
2. Design of Bridge Structures, T. R. Jagadeesh, M.A. Jayaram, PHI
3. Design of Bridges, N. Krishna Raju, Tata McGrawHill

References:

1. Design of Concrete Bridges, Aswini, Vazirani,Ratwani
2.Design of Steel Structures, B. C. Punmai, Jain & Jain, Lakshmi Publications
3. Design of R C Structures, B. C. Punmai, Jain & Jain, Lakshmi Publications

PROFESSIONAL ELECTIVE – VII

C) FINITE ELEMENT METHODS

VII SEMESTER

Lecture:3 Tutorial: - Internal Marks 30
Credits:3 External Marks 70

Course Learning Objectives:
The objective of this course is:

- Equip the students with the fundamentals of Finite Element Analysis
- Enable the students to formulate the design problems into FEA.
- Enable the students to solve Boundary value problems using FEM

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

- Solve simple boundary value problems using Numerical technique of Finite element method
- Develop finite element formulation of one- and two-dimensional problems and solve them.
- Assemble Stiffness matrices, apply boundary conditions and solve for the displacements
- Compute Stresses and Strains and interpret the result.

SYLLABUS:

UNIT-I Introduction: Review of stiffness method- Principle of Stationary potential energy- Potential energy of an elastic body- Rayleigh-Ritz method of functional approximation. Principles of Elasticity- Equilibrium Equations- Strain Displacement relationships- Constitutive relationship for plane stress, plane stain and axi symmetric bodies of revolution with axi symmetric loading.

UNIT-II Finite element formulation of Beam elements: Beam stiffness- assemblage of beam stiffness matrix- Examples on Analysis of beams Subjected to Concentrated and Distributed loading.

UNIT-III Finite Element formulation of truss element: Stiffness matrix- properties of stiffness matrix –Selection of approximate displacement functions- solution of a plane truss transformation
matrix- Galerkin's method for 1-D truss – Computation of stress in a truss element.

UNIT-IV Finite element formulation for plane stress and plane strain problems- Derivation of CST and LST stiffness matrix and equations-treatment of body and surface forces

UNIT-V Iso-parametric Formulation: An isoparametric bar element- plane bilinear isoparametric element – quadratic plane element - shape functions, evaluation of stiffness matrix, consistent nodal load vector - Gauss quadrature for performing numerical
integrations.

Text Books:

1. A first course in the Finite Element Method, Daryl L. Logan, Thomson Publications.
2. Introduction to Finite Elements in Engineering, Tirupati R. Chandrupatla, Ashok D. Belgundu, PHI publications.,
4. Introduction to Finite Element Method, Desai & Abel CBS Publications

References:

1. Concepts and applications of Finite Element Analysis, Robert D. Cook, Michael E Plesha, John Wiley & sons Publication.

PROFESSIONAL ELECTIVE – VII

D) GROUND IMPROVEMENT TECHNIQUES

VII SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Learning Objectives:

The objective of this course is:

- To make the student appreciate the need for different ground improvement methods adopted for improving the properties of remoulded and in-situ soils by adopting different techniques such as in situ densification and dewatering methods.
- To make the student understand how the reinforced earth technology and soil nailing can obviate the problems posed by the conventional retaining walls.
- To enable the students to know how geotextiles and geosynthetics can be used to improve the engineering performance of soils.
- To make the student learn the concepts, purpose and effects of grouting.

Course Outcomes: By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations.

- The student should be in a position to design a reinforced earth embankment and check its stability.
- The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice.
- The student should be able to understand the concepts and applications of grouting.

SYLLABUS:

UNIT- I In situ densification methods- in situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.

UNIT –II Dewatering – sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells – criteria for choice of filler material around drains – electro osmosis

UNIT- III Stabilization of soils – methods of soil stabilization – mechanical – cement – lime – bitumen and polymer stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.

UNIT- IV Reinforce earth – principles – components of reinforced earth – design principles of reinforced earth walls – stability checks – soil nailing.

UNIT- V Geosynthetics – geotextiles – types – functions, properties and applications – geogrids, geomembranes and gabions - properties and applications. Grouting – objectives of grouting – grouts and their applications – methods of grouting – stage of grouting – hydraulic fracturing in soils and rocks – post grout tests

Text Books:

1. Ground Improvement Techniques, Purushotham Raj, Laxmi Publications, New Delhi.
2. Ground Improvement Techniques, Nihar Ranjan Patro, Vikas Publishing House (p) limited, New Delhi. 3. An introduction to Soil Reinforcement and Geosynthetics, G. L. Siva Kumar Babu, Universities Press.

Reference:

1. Ground Improvement, M.P. Moseley, Blackie Academic and Professional, USA. 2. Designing with Geosynethetics, R. M Koerner, Prentice Hall

OPEN ELECTIVE – III

A) REMOTE SENSING AND GIS

VII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

The course is designed to:

1. Introduce the basic principles of Remote Sensing and GIS techniques.
2. Learn various types of sensors and platforms
3. learn concepts of visual and digital image analyses
4. Understand the principles of spatial analysis
5. Appreciate application of RS and GIS to Civil engineering

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Be familiar with ground, air and satellite based sensor platforms.
2. Interpret the aerial photographs and satellite imageries
3. Create and input spatial data for GIS application
4. Apply RS and GIS concepts in water resources engineering

SYLLABUS

UNIT – I: Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems. Sensors and platforms: Introduction, types of sensors, airborne remote sensing, space borne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT.

UNIT – II: **Image analysis**: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – III: Geographic Information System: Introduction, key components, application areas of GIS, map projections. Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT – IV: Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

UNIT – V: RS and GIS applications: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications. Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

TEXT BOOKS

1. Bhatta B (2008), 'Remote sensing and GIS', Oxford University Press
2. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013) 'Remote Sensing and Image Interpretation', Wiley India Pvt. Ltd., New Delhi
3. Schowenger, R. A (2006) 'Remote Sensing' Elsevier publishers.
4. 'Fundamentals of Remote Sensing' by George Joseph, Universities Press, 2013.
5. 'Fundamentals of Geographic Information Systems' by Demers, M.N, Wiley India Pvt. Ltd, 2013.

REFERENCES

1. 'Remote Sensing and its Applications' by Narayan LRA, Universities Press, 2012.
2. 'Concepts and Techniques of Geographical Information System' by Chor Pang Lo and A K W Yeung, Prentice Hall (India), 2006
3. 'Introduction to Geographic Information Systems' by Kand Tsung Chang, McGraw Hill Higher Education, 2009.
4. 'Basics of Remote sensing & GIS' by Kumar S, Laxmi Publications, New Delhi, 2005.
5. 'Principals of Geographical Information Systems' by Burrough P A and R.A. McDonnell, Oxford University Press, 1998.

OPEN ELECTIVE – III
B) GREEN BUILDINGS
VII SEMESTER

SEMESTER VII

Lecture: 2	Practical: 0	Internal Marks	: 30
Credits: 2		External Marks	: 70

Course Objectives:

The objective of this course is:

- To introduce the different concepts of green building techniques and how they may be synthesized to best fit a construction.
- To Know the importance of Green buildings
- To know and implement energy conservation and renewable resources
- To understand the knowledge of ECBC, LEED, GRIHA etc.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

- Able to describe the importance and necessity of green building.
- Able to suggest materials and technologies to improve energy efficiency of building.
- Able to assess a building on the norms available for green building.

SYLLABUS:

UNIT I - INTRODUCTION

Introduction of Green Buildings, Salient features of green buildings, Advantages of Green Buildings- Sustainable site selection and planning of buildings to improve comfort, day lighting, ventilation, planning for drainage.

UNIT II - ENERGY EFFICIENT BUILDINGS

Passive cooling and day lighting – Active solar and photovoltaic, building energy analysis methods, Lighting system design, Lighting economics and aesthetics, Impacts of lighting efficiency, Technological options for energy management.

UNIT III - ENERGY CONSERVATION

Need for energy conservation, various forms of energy used in buildings, embodied energy of materials, energy used in transportation and construction processes- water conservation systems in buildings, waste to energy management in residential complexes or gated communities.

UNIT IV - RENEWABLE ENERGY RESOURCES

Wind and Solar Energy Harvesting, potential of solar energy in India and world, construction and operation of various solar, windand hydro power appliances, success case studies of fully solar, wind and hydro power energies.

UNIT V – ENERGY REQUIREMENT AND GREEN BUILDING RATING SYSTEMS

Energy Conservation Building Code (ECBC) requirement for green buildings, Requirement for green rating systems - Leadership in Energy and Environment Design (LEED), Green Rating systems for Integrated Habitat Assessment (GRIHA), Building automation and building management systems.

TEXTBOOKS:

1. 'Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers', 2009
2. 'Alternative building materials and technologies' by K.S. Jagadish, B.V. Venkatarama Reddy and K.S. Nanjunda Rao.
3. 'Green Building Handbook' by Tomwoolley and Samkimings, 2009

REFERENCE BOOKS:

1. 'Complete Guide to Green Buildings' by Trish riley.
2. 'Non-Conventional Energy Resources' by G. D. Rai, Khanna Publishers.
3. 'Standard for the design for High Performance Green Buildings' by Kent Peterson, 2009
4. Ganesan T P, "Energy Conservation in Buildings", ISTE Professional Center, Chennai, 1999.

ENVIRONMENTAL ENGINEERING LAB

VI SEMESTER

Lecture: 0 Practical: 3	Internal Marks : 40
Credits:1.5	External Marks : 60

Course Objectives: the objectives of the course are to

- **Perform** the experiments to determine water and waste water quality
- **Understand** the water & waste water sampling, their quality standards
- **Estimate** quality of water, waste water, Industrial water

Practical Work: List of Experiments

1. Determination of PH Value of water and soil
2. Determination of Electrical Conductivity and salinity of water and soil
3. Determination of physical parameters (temp, colour, odour, taste, appearance)
4. Determination of total suspended and dissolved solids in water / sewage sample.
5. Determination of fixed and volatile solids in water / sewage sample.
6. Determination of turbidity of water / sewage sample.
7. Determination of Acidity of water sample
8. Determination of Alkalinity of water sample
9. Determination of Hardness (Total, Calcium and Magnesium Hardness)
10. Determination of Chlorides in water and soil
11. Determination of optimum coagulant Dosage by Jar Test
12. Determination of Dissolved Oxygen (Winkler Method) of water/sewage sample
13. Determination of COD of waste water
14. Determination of BOD of waste water
15. Determination of Residual Chlorine and Chlorine Demand

Reference Books:

1. Chemical Analysis of Water And Soil by K.V.S.G. Murali Krishna, Reem Publications Pvt. Ltd.
2. Manual on Water Supply & Treatment; CPH and EEO, Ministry of Urban Development; Govt. of India, New Delhi.

STAAD PRO AND GIS LAB

VI SEMESTER

Lecture: 0 Practical: 3	Internal Marks : 40
Credits:1.5	External Marks : 60

Course Learning Objectives:

The course is designed to

- Introduce image processing and GIS software
- Familiarize structural analysis software • understand the process of digitization, creation of thematic map from topo sheets and maps
- Learn to analyze 2 d and 3d frame steel tubular truss using structural analysis software
- Learn to analyze and design retaining wall and simple towers

Course outcomes

At the end of the course the student will be able to

- Work comfortably on GIS software
- Digitize and create thematic map and extract important features
- Use structural analysis software to analyze and design 2D and 3D frames
- Design and analyze retaining wall and simple towers using CADD software.

SYLLABUS:

COMPUTER AIDED DESIGN

SOFTWARE: 1. STAAD PRO 2. STRAAP 3. STUDDS

By using one of the above software, the following exercises are to be performed.

EXCERCISES:

1. Analysis of beams with various loading conditions
2. 2-D Frame Analysis and Design
3. 2-D Frame Analysis with various load combinations
4. Multistorey Building analysis and Design
5. Retaining Wall Analysis and Design
6. Simple Water Tank Analysis and Design

GIS:

SOFTWARES: 1. Arc GIS 9.0 2. ERDAS 8.7 3. Mapinfo 6.5

Any one or Equivalent.

EXCERCISES IN GIS:

1. Digitization of Map/Toposheet
2. Creation of thematic maps.
3. Estimation of features and interpretation
4. Simple applications of GIS in water Resources Engineering & Transportation Engineering.

TEXT BOOK:

1. 'Concept and Techniques of GIS' by C.P.L.O. Albert, K.W. Yong, Printice Hall Publishers

INTERNSHIP/SOCIAL RESPONSIBILITY PROJECT

VII SEMESTER

Lecture: 0 Practical: 4	Internal Marks : 40
Credits:2	External Marks : 60

A) There shall be an Industrial oriented Internship / Social Responsibility Project in Collaboration with an Industry (or) Government organization of the relevant specialization to be registered immediately after III Year II Semester Examinations and taken up during the summer vacation for about Minimum six weeks duration.

B) The industry-oriented Internship or Social responsibility project shall be submitted in a report form, and a presentation of the same shall be made before a Committee, which evaluates it for 100 marks. The committee shall consist of Head of the Department, the supervisor of internship and a Senior Faculty Member of the Department. There shall be no internal marks for Industry oriented internship. The internship / social responsibility project shall be evaluated in the IV year I Semester.

VIII

SEMESTER

SYLLABUS

MOOCS/ SURVEY CAMP

VIII SEMESTER

Lecture: 0 Practical: 4 Internal Marks : 40
Credits:2 External Marks : 60

MASSIVE OPEN ONLINE COURSES:

Greater flexibility to choose variety of courses is provided through Massive Open Online Courses (MOOCs) during the period of study. Students are permitted to register for MOOCs from fifth semester However the Departmental Committee (DC) of the respective has to approve the courses under MOOCs. The grade equivalency will be decided by the respective Board of Studies (BoS).

The student should select the subject of discipline centric for MOOC. The Students can register from NPTEL/GIAN/TEQIP. The registration can be done any time from fifth semester.

(or)

SURVEY CAMP:

Pre-requisites:

Knowledge of Surveying, Irrigation and Bridge Drawing, High way Engineering Town Planning and Water Resource Engineering,
The most important pillar of learning is “DOING”. Civil Engineer should be very conversant with the actual works of surveying, which this survey camp/project aims at the following course objectives.

Course Objectives of the survey camp works are:

1. Apply knowledge of mathematics, science, and engineering to understand the measurement techniques
2. To train the students under difficult and realistic situation of the surveying project.
3. To acquire a sound practical knowledge and application of theory and in practical to overcome the difficulties that could arise in field during surveying.
4. The use of different survey instrument and to develop the team spirit at work
5. To impart training in the use of modern surveying instruments and to acquire a comprehensive idea of the project.
6. To impart confidence in the handling and management of the survey project.

Sample Survey Projects:

1. Triangulation with Total Station.

2. New Tank Project

1. Reconnaissance of the area to be mapped. setting benchmark using GPS
2. Fly levelling to establish T.B.M to the site& fly-back levelling
3. Fixing the alignment of proposed bund,
4. Conduct profile levelling and cross sectioning along the proposed centre line of the tank bund.
5. Capacity of reservoir by Radial contouring
6. Calculation of capacity
7. Block levelling at Sluice point of centre line of bund
8. Block levelling for weir
9. Canal Alignment Starting from sluice point with longitudinal sectioning and cross sectioning
10. To determine the azimuth of a line, latitude and longitude of the place by taking extra-meridian observation on a sun. Use of GPS to determine latitude and longitude

(Graded activities) Drawings to be prepared

1. Index Map
2. Contour map of water spread area with Capacity of reservoir calculations
3. Longitudinal sectioning
4. Cross sectioning
5. Block levelling with contours showing weir details should consist of

1. Half plan at top & half plan at foundation.
2. Half sectional elevation, half front elevation.
3. Cross section of tank weir across the body wall.

6. Block levelling with contours showing sluice details should consist of

1. Half plan at top & half plan at foundation.
2. Half sectional elevation, half front elevation.
3. Cross section of tank weir across the body wall.

7. Canal cross-section of fully cutting, fully filled and Partial at different chainages
8. Longitudinal sectioning of Canal at different chainages
9. Plan of bund & canal alignment showing location of hydraulic structures and various reduced levels

3. Quantity surveying

1. Earthwork calculation of bund.
2. Earthwork calculation of canal.
3. Estimation of weir positioned on block levelling.
4. Estimation of Sluice positioned on block levelling.

4. Highway Project:

(Terrain should be chosen such that it should include vertical & Horizontal curve)

1. Reconnaissance of the area
2. Align a new road between two obligatory points.
3. Conduct Longitudinal and cross-sectioning surveys
4. Projecting a road of given gradient.
5. Block leveling @ the lowest level or valley curve
6. Connecting to new road alignment, surveying existing road 90m and exploring possibility of widening.

(Graded activities) Drawings to be prepared (Drawing should be preferably done using AutoCAD).

1. Index plan
2. Plan showing alignment of road
3. L.S & C.S of Road at different chainages as per IRC standards(Report should justify the selected alignment with details of all geometric designs for horizontal curve, traffic and design speed assumed)
4. Block levelling @ the lowest level or valley curve placing Culvert/Bridge
1. Half plan at top & half plan at foundation.
2. Half sectional elevation, half front elevation.
3. Half Cross section @centre half Cross section @ abutment

Quantity surveying

1. Calculate the earthwork involved by determining the cross-section of the highway at various intervals.
2. Quantity surveying of Proposed culvert/Bridge

5. Town Planning Project

1. Town planning project new layout as per Zoning Regulations by using total station
2. Preparation of existing village map/layout 2 days.

6. Water Supply and Sanitary Project

(Public Health Engineering)
1. Examination of sources of water supply
2. Calculation of quantity of water required based on existing and future projected population for a village.
3. Preparation of village map and location of sites for ground level
4. Block leveling for overhead tanks
5. Underground drainage system surveys for laying the sewers.
6. Block leveling for Oxidation pond.

(Graded activities) Drawings to be prepared

1. Plan of water supply line, sewer lines in village map
2. Block leveling placing overhead tanks
3. Block leveling Placing Oxidation pond.

Quantity surveying

1. Estimation of manhole
2. Estimation of water supply line, Overhead tank

Note:

1. At least one of the above should be done by using TOTAL STATION
2. The survey camp Report should be attached with field book, calculation sheets, all plans/drawings, estimates of earth work and structure in spread sheet and should be submitted in the form of Hardcopy and softcopy (CD)

PROFESSIONAL ELECTIVE – VIII
(A).PRESTRESSED CONCRETE
VII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Course Objectives:

The objective of this course is:

- Familiarize Students with concepts of prestressing
- Equip student with different systems and devices used in prestressing
- Understand the different losses of prestress including short- and long-term losses
- Familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion

SYLLABUS:

UNIT-I Basic concepts of Pre-stressing- Advantages and Applications of Pre-stressed Concretes, Difference between PSC & RCC, High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics, High strength Steel- Types, Strength- Permissible Stresses- Relaxation of Stress, Cover Requirements.

UNIT-II Pre-stressing Systems- Introduction, Tensioning devices, Pre-tensioning Systems, Post tensioning Systems, Basic Assumptions in Analysis of prestress and design, Analysis of prestress, Resultant Stresses at a section- pressure line- Concepts of load balancing- Stresses in Tendons, Cracking moment.

UNIT-III Losses of Pre-stressing- Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation stress in steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Total losses allowed for design

UNIT-IV Design for Flexural resistance- Types of flexural failure – Code Procedures-Design of sections for flexure- Control of deflections- Factors influencing Deflection-Prediction of short-term deflections.

UNIT-V Design for Shear and Torsion- Shear and Principal Stresses- Design of Shear reinforcements- Codal Provisions- Design for Torsion, Design for Combined bending, shear and torsion.

Introduction to Transfer of Prestress in pretensioned and post-tensioned- Transmission Length - Stress Distribution in End block and Anchorage Zone reinforcement.

Text Books

1. Prestressed Concrete, N. Krishna Raju, Tata McGraw hill
2. Prestressed Concrete, S. Ramamrutham

References:

1. Prestressed Concrete, P. Dayaratnam
2. Prestressed Concrete, T. Y. Lin & Burns, Wiley Publications

PROFESSIONAL ELECTIVE – VIII
(B). BUILDING SERVICES AND MAINTENANCE
VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Course Learning Objectives:
The objective of this course is:
1. To learn about Ventilation and Air conditioning
2. To know about Fire Hazards, Safety Regulations in various Building Types
3. To know about Water Supply System
4. To get an idea about Lifts, Planning of Electrical Installations

Course Outcomes:
By the end of this the student will be able to maintain buildings

SYLLABUS

Unit -1: Ventilation and Air conditioning: Ventilation–Necessity of Ventilation – Functional Requirements– Systems of Ventilation – Types – Natural Ventilation – Artificial Ventilation – Air Conditioning – Systems of Air Conditioning – Essentials of Air Conditioning systems – Protection against fire caused by Air Conditioning Systems. Thermal Insulation: Heat Transfer – Thermal Insulating Materials – General Methods of Thermal Insulation – Economics of Thermal Insulation – Thermal Insulation of Exposed Walls, Doors, Windows and Roofs.

Unit -2 : Fire Safety: Fire Hazards, Causes of Fire in Buildings, Fire Load – Safety Regulations – Characteristics of Fire Resisting Materials – General Fire Safety Requirements for Buildings – NBC – Planning Considerations in Buildings like Non–combustible Materials, Fire Resistant Construction, Staircases and Lift Lobbies, Fire Escapes and A.C. Systems – Building Types – Heat and Smoke Detectors – Fire Alarms, Snorkel Ladder – Fire Fighting Pump and Water Storage –Dry and Wet Rises – Automatic Sprinklers.

Unit – 3: Plumbing Services: Water Supply System –Fixing the Pipe in Building – Maintenance of Building Pipe Line – Water Meters – Sanitary Fittings – Principles Governing Design of Building Drainage – Gas Supply Systems.

Unit - 4: Machineries in Buildings: Lifts – Definitions – Essential Requirements – Design Considerations – Maintenance Escalators – Essential Requirements, Pumps – Types of Pumps, Pumps for Household, Flats and Pumps for Dewatering .

Unit - 5 :Electrical Installation in Buildings: Lighting for Office Buildings – School Buildings – Residential Buildings – Fannage – Air Conditioning/Heating – Reception and Distribution of Main Supply – Fittings and Accessories – Method of Internal Wiring – Earthing
– Planning of Electrical Installations – Lightening Arrestors – Earthing Anti–termite Treatment: Types of Termites, Internal and External Anti-termite Treatments – Preconstruction Treatment – Post-construction Treatment – Preventive Measures.

Text Books

1. Building Construction by B.C.Punmia, Er. Ashok K Jain, Arun K Jain, Laxmi Publications (P) Ltd., New Delhi.
2. Building Construction by Janardhan Jha, S K Sinha, Khanna Publishers.
3. Building construction by Rangwala, Charotar Publishibg House.

Reference Books

1. National Building Code, Bureau of Indian Standards, 2016.
2. Building Services Engineering by David V.Chadderton, Routledge
3. Building Construction by P.C.Varghese, Prentice Hall India Learning.

PROFESSIONAL ELECTIVE – VIII

(C).URBAN TRANSPORTATION ENGINEERING

VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Course Learning Objectives:

The objective of this course is:

1. To learn various procedures for travel demand estimation.
2. To various data collection techniques for OD data.
3. To know various models and techniques for trip generation, trip distribution, mode choice and traffic assignment.
4. To develop alternative urban transport network plans.

Course Outcomes:

At the end of course, Student can

1. Estimate travel demand for an urban area.
2. Plan the transportation network for a city.
3. Identify the corridor and plan for providing good transportation facilities.
4. Evaluate various alternative transportation proposals.

SYLLABUS:

UNIT -I

Urban Transportation Problems & Travel Demand: Urban Issues, Travel Characteristics, Evolution of Planning Process, Supply and Demand – Systems approach; Trends, Overall Planning process, Long term Vs Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques.

UNIT -II

Data Collection and Inventories: Collection of data – Organization of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship.

UNIT -III

Trip Generation & Distribution: UTPS Approach, Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates; Trip Distribution: Growth Factor Methods, Gravity Models, Opportunity Models, Time Function Iteration Models.

UNIT -IV

Mode Choice Analysis: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Aggregate and Disaggregate Approaches; Discrete Choice Analysis, Choice sets, Maximum Utility, Probabilistic Models: Binary Logit, Multinomial Logit Model – IIA property; Aggregation.

UNIT -V

Traffic Assignment: Diversion Curves; Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment.

Corridor Identification, Plan Preparation & Evaluation: Master plans, Selection of Corridor, Corridor Identification, Corridor deficiency Analysis; Travel Forecasts to Evaluate Alternative Improvements.

TEXT BOOKS:

1. 'Introduction to Urban System Planning' by Hutchinson, B.G., McGraw Hill.
2. 'Transportation Engineering - An Introduction' by Khisty C.J., Prentice Hall.
3. 'Fundamentals of Transportation Planning' by Papacostas, Tata McGraw Hill.

REFERENCES:

1. 'Urban Transportation Planning: A decision-oriented Approach' by Mayer M and Miller E, McGraw Hill.
2. 'Introduction to Transportation Planning' by Bruton M.J., Hutchinson of London.
3. 'Metropolitan Transportation Planning' by Dicky, J.W., Tata McGraw Hill.
4. 'Traffic Engineering and Transportation Planning' by Kadiyali.L.R., Khanna Publishers, New Delhi.

PROFESSIONAL ELECTIVE – VIII

(D).EARTH QUAKE RESISTANT STRUCTURES

VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Course Learning Objectives:

The objective of this course is:

- Familiarize Students with Engineering Seismology
- Equip student with concepts of Structural Dynamics
- Understand Concepts of Seismic Design
- Familiarize with Design philosophies for Seismic loading
- Familiarize students with various IS codal provisions for ductile design and detailing

Course Outcomes:

- At the end of this course the student will be able to
- a) Explain fundamentals of Engineering Seismology
- b) Acquaint with the principle's Structural dynamics
- c) Solve SDOF Systems and suggest ductile design
- d) Compute equivalent lateral seismic loads and carryout a seismic design as per IS codal provisions

SYLLABUS:

UNIT-I

Engineering Seismology – rebound theory – plate tectonics – seismic waves- Earthquake size and various scales – local site effects – Indian seismicity –seismic zones of India – theory of vibrations – near ground and far ground rotation and their effects.

UNIT-II

Introduction to Structural Dynamics: Fundamental objective of Dynamic analysis – Types of prescribed loadings – Formulation of the Equations of Motion– Elements of a Vibratory system – Degrees of Freedom – Oscillatory motion – Simple Harmonic Motion – Free Vibrations of Single Degree of Freedom (SDOF) systems – Undamped and Damped – Critical damping – Logarithmic decrement – Forced vibrations of SDOF systems – Harmonic excitation – Dynamic magnification factor.

UNIT-III

Seismic design concepts: EQ load on simple building – load path – floor and roof diaphragms – seismic resistant building architecture – plan configuration– vertical configuration – pounding effects – mass and stiffness irregularities– torsion in structural system- Provision of seismic code (IS 1893 & 13920) -Building system – frames – shear wall – braced frames – layout design of Moment Resisting Frames (MRF) – ductility of MRF – Infill wall – Nonstructural elements.

UNIT-IV

Calculation of equivalent lateral force- Design Base Shear- Storey Shear, Estimation of Natural period of Structure, Computation of Response acceleration Coefficient- Zone factor Seismic weight, Response reduction factors- Seismic Coefficient Method (IS 1893).

UNIT-V

Design and ductile detailing of Beams and columns of frames -Concept of strong column weak beams, Ductility criteria for earthquake resistant design, Ductile detailing of flexural members as per IS 13920- Longitudinal reinforcement, Shear reinforcement, Anchorage of reinforcement- Development length, Lap Splices. Seismic Analysis and design of simple 2-storied RC Building frame –Equivalent static lateral force method and response spectrum method.

TEXT BOOKS

1. 'Earthquake Resistant Design of Structures' -Pankaj Agarwal and Manish Shri Khande, Prentice – Hall of India, 2007, New Delhi.
2. 'Earthquake Resistant Design of Building Structures' by Vinod Hosur, Wiley India Ltd.
3. 'Reinforced Concrete Design' by A. K. Jain.
4. 'Geotechnical Earthquake Engineering' by S. L. Kramer.

REFERENCES

1. 'Introduction to the Theory of Seismology' by Bullen K.E., Great Britain at the University Printing houses, Cambridge University Press 1996.
2. Relevant code of practices.

PROFESSIONAL ELECTIVE – IX
(A).CONSTRUCTION TECHNOLOGY AND MANAGEMENT

VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Pre-Requisites: Building Materials & Building Construction

Course Objectives:

1) This subject deals with overall planning, coordination and control of projects.
2) This course gives the students scientific principles involved in construction, an understanding of the behavior of construction materials and fundamentals of structural mechanics.

Course Outcomes:

After the completion of the course student should be able to

1) Able to perform construction operation planning & management

SYLLABUS

UNIT -I

Management process- Roles. management theories. Social responsibilities. planning and strategic management. strategy implementation. Decision making: tools and techniques – Organizational structure. Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources- Functions of Construction Management and its Applications. Preliminary Planning- Collection of Data- Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling. Forms of scheduling - Resource allocation. budget and budgetary control methods.

UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration. negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws -Construction Finance - Safety in construction: legal and financial aspects of accidents in construction. occupational and safety hazard assessment. Human factors in safety. legal and financial aspects of accidents in construction. occupational and safety hazard assessment.

TEXT BOOKS

1. Ghalot, P.S., Dhir, D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara, K.K., Construction Project Management¸ Tata McGraw Hill Publishing Co, Ltd., New Delhi,998.
3. Punmia.B.C., Project Planning and Control with PERT and CPM, Laxmi Publications, New Delhi,1987.

REFERENCES:

1. **Construction Management And Planning** by: sengupta, b. /guha, h. tata mcgraw-hill publications.
2. **Construction Project Management** by Kumar Neeraj Jha, Pearson Publications.

PROFESSIONAL ELECTIVE – IX

(B).PORT AND HARBOUR STRUCTURES

VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Pre-Requisites: Surveying, Transportation Engineering

Course Objectives: To have a knowledge about growth and regulation of ports, harbor planning site investigation, ocean waves, berthing structures and design principles of dock structures

Course Outcomes: After the completion of the course student should be able to

To have a knowledge about growth and regulation of ports, harbor planning site investigation, ocean waves, berthing structures and design principles of dock structures

SYLLABUS

UNIT-I

Growth and regulation of Ports: History of Port. Classification of Harbours - Factors affecting the growth of Port. - Requirement of a Harbour - General Planning. Port capacity. traffic analysis - Berth occupancy. financial evaluation - EIA -Description of selected Indian ports.

UNIT-II

Harbour Planning (Technical) Site investigation. harbour entrance - Navigational Channel. Depth of harbour. Turning basin. Anchor basin. berthing area. Storage area - Shipping terminal facilities. Essentials of passenger terminal, dry bulk cargo terminal, Liquid bulk cargo terminals and container terminals.

UNIT-III

Introduction to ocean waves. Wave transformation. Wave and wind climate inside Harbour – Break waters: Types. Factors determining their selection. Forces on break waters. Design of rubble mound and vertical break waters. Physical Model Studies.

UNIT-IV

Berthing structures. Types. Loads. Selection of berthing structures. Design principles of diaphragm walls, dolphins and piles. Selection and Design principles of Dock fenders and Mooring accessories.

UNIT- V

Design principles of dock structures - Graving dry dock. Slip way. floating dry dock - Monitoring and repair of harbour structures - Dredging - Navigational aids. Light house.

TEXT BOOKS

1. S P Bindra, A Course in Docks and Harbour Engineering, Dhanpat Rai and Sons, New Delhi, 1993.
2. Oza and Oza, “A course in Docks & Harbour Engineering”.

REFERENCES

1. Harbour and Coastal Engineering (Indian Scenario) Vol - I & Vol . II; S. Narasimhan & S. kathiroli, NIOT- Chennai
2. Design and construction of Port and marine Structures. Alonzo Def. Quinn. McGraw. Hill book Company
3. IS: 7314 1974 - Glossary of terms relating to Port and harbour Engineering.
4. IS: 4651 - Code of practice for Planning and Design of Port and harbour (Part. I) Site Investigation.
5. IS: 4651 - Code of practice for Planning and Design of Port and harbour (Part. II) Earth Pressure.
6. IS: 4651 - Code of practice for Planning and Design of Port and harbour (Part. III) Loading.
7. IS: 4651 - Code of practice for Planning and Design of Port and harbour (Part. IV) General Design Consideration.
8. IS: 4651 - Code of practice for Planning and Design of Port and harbour (Part. V) Layout and functional Requirement.

PROFESSIONAL ELECTIVE – IX

(C).ELEMENTS OF EARTHQUAKE ENGINEERING

VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Pre-Requisites: Structual Engineering –II & RC Design

Course Objectives: To understand the analysis of the behaviour of structures under dynamic loads and understand the principles of design for seismic and wind loads and relevant codal provisions

Course Outcomes: After the completion of the course student should be able to

1. Explain and derive fundamental equations in structural dynamics
2. Discuss and explain causes and Theories on earthquake, seismic waves, measurement of earthquakes
3. Evaluate base shear using IS methods
4. Design and Detail the reinforcement for earthquake forces

SYLLABUS

UNIT I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics-Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy Released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous System-Lumped mass idealization-Oscillatory Motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system- undamped and damped-critical damping-Logarithmic Decrement-Forced Vibrations-Harmonic Excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT II

Conceptual design: Introduction-Functional Planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical Members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT III

Reinforced Concrete Buildings: Principles of earthquake resistant deign of RC members- Structural models for frame buildings- Seismic methods of analysis- Seismic deign methods- IS code based methods for seismic design- Seismic evaluation and retrofitting- Vertical irregularities- Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT IV

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures. Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams, columns and joints in RC buildings during earthquakes-Vulnerability of open ground storey and short columns during earthquakes.

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Eartquake Resistant Design of Buidling structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
4. Masory and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros

Earthquake Tips – Learning Earthquake Design and ConstructionC.V.R. Murthy

Reference Codes:

1. IS: 1893 (Part-1) -2002. “Criteria for Earthquake Resistant – Design of structures.” B.I.S., New Delhi.
2. IS:4326-1993, “ Earthquake Resistant Design and Construction of Building”, Code of Practice B.I.S., New Delhi.
3. IS:13920-1993, “ Ductile detailing of concrete structures subjected to seismic force” – Guidelines, B.I.S., New Delhi.

PROFESSIONAL ELECTIVE – IX
(D).TRAFFIC ENGINEERING

VIII SEMESTER

Lecture:2	Tutorial: -	Internal Marks	30
Credits:2		External Marks	70

Pre-Requisites: Transportation Engineering

Course Objectives: To provide engineering techniques to achieve the safe and efficient movement of people and goods on roadways.

Course Outcomes: At the end of the course the student will be able to
To provide engineering techniques to achieve the safe and efficient movement of people and goods on roadways.

SYLLABUS

Unit 1: Traffic Studies (Part- I) : Basic principles of Traffic, Volume, Speed and Density; Definitions and their interrelationships; Traffic Volume studies - Objectives, Methods of Volume counts, Presentation of Volume Data; Speed studies- Types of Speeds, Objectives, Methods of speed studies, Statistical Methods for speed data Analysis, Presentation of speed data. Delay Studies; Head ways and Gap Studies - Headway and Gap acceptance, Origin and Destination Studies.

Unit 2: Traffic Studies (Part-II): Parking Studies: parameters of parking, definitions, Parking inventory study, Parking survey by Patrolling method; Analysis of Parking Survey data; Accident studies- Causative factors of Road accidents, Accident data collection: Accident analysis and modeling; Road Safety Auditing, Measures to increase Road safety.

Unit 3: Capacity and LOS Analysis: Introduction to Traffic capacity, Analysis concepts, Level of Service, Basic definitions, Factors affecting Capacity and LOS, Capacity of Urban/Rural Highway, With or without access control, Basic freeway segments - Service flow rate of LOS, Lane width or Lateral clearance adjustment; Heavy vehicle adjustment; Driver population adjustment.

Unit 4: Signal Designing – Fixed Time signals, Determination of Optimum Cycle length and Signal setting for Fixed Time signals, Warrants for Signals, Time Plan Design for Pre-Timed Control- Lane group analysis, Saturation flow rate, and Adjustment factors, Uniform and Incremental Delay, Vehicle Actuated Signals, Signal Coordination.

Unit 5: Transportation System Management - Measures for Improving vehicular flow – one-way Streets, Signal Improvement, Transit Stop Relocation, Parking Management, Reversible lanes- Reducing Peak Period Traffic - Strategies for working hours, Congestion Pricing, Differential Toll Policies.

References:

1. Traffic Engineering and Transportation Planning – L.R. Kadiyali, Khanna Publishers
2. Principles of Highways Engineering and Traffic Analysis - Fred Mannering & Walter Kilareski, John Wiley & Sons Publication
3. Fundamentals of Transportation Engineering - C.S.Papacostas, Prentice Hall India.
4. IRC Codes
5. Traffic Engineering - Theory & Practice - Louis J.Pignataro, Prentice Hall Publication.
6. Traffic Engineering by Roger P.Roess, William R. Mc. Shane, Elena S.Prassas , Prentice Hall,1977.
7. Transportation Engineering – An Introduction - C.Jotin Khisty, Prentice Hall Publication
8. Fundamentals of Traffic Engineering – McShane & Rogers.
9. Highway Capacity Manual -2000.

OPEN ELECTIVE – IV

A) ADVANCED CIVIL ENGINEERING TECHNOLOGIES

VIII SEMESTER

Lecture:3	Tutorial: -	Internal Marks	30
Credits:3		External Marks	70

Course Objectives:

The objective of this course is:

1. To give a brief Introduction on smart technologies
2. Learn about prestressed concrete techniques
3. To understand the principles and uses of Electronic Surveying instruments
4. To understand Pre - fabricated building technology
5. To give a brief knowledge on Advanced methods in Earth retaining structures

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Apply the principles and uses of Electronic Surveying instruments
2. Understand the Pre stressed concrete
3. Advanced methods in Earth retaining structures
4. Application Pre - fabricated building technology

SYLLABUS

UNIT 1. **Smart Technologies:**

Overview of IoT - Define IoT, how IoT work, key features of IoT, components of IoT : hardware, software, technology and protocols, advantages and disadvantages of IoT – IoT Applications - Smart Cities, Smart Energy and the Smart Grid, Smart Transportation and Mobility, Smart Home, Smart Buildings and Infrastructure

UNIT 2. Electronic Survey instruments and GPS and GIS

Principle and uses of EDM – Electronic theodolite, features – uses. Global positioning system (G.P.S) – principle – segments – space, control and user segments – receivers – observation and data processing - applications in Civil Engineering – advantages and disadvantages of GPS.Geographical Information System (GIS) – definition– types data used – use and application of GIS in Civil Engineering.

UNIT 3. Prestressed Concrete

Introduction – Basic principles – Systems of prestressing – Types of prestressing .Advantages and Disadvantages. Requirements of steel and concrete for prestressed concrete. Losses of Prestress. Tensioning devices – Method of Prestressing – Pretensioning system – Post tensioning systems.

UNIT 4 Advanced methods in Earth retaining structures

Concept of advanced earth retaining structures. Advantages of advanced earth retaining structures Methods of advanced earth retaining structures –Reinforced anchored earth wall geogrids, geomats,

UNIT 5 Pre-fabricated building technology

Alternatives for cast in-situ structures - Understand pre fabrication technology -Importance for standardization– pre fabricated structures their utility & advantages Materials used in pre-fabricated elements – suitability for various climatic conditions. Types of pre-fabricated systems – large panel systems - frame systems – slab /column systems with walls – mixed systems

TEXT BOOKS

1. Prestressed Concrete by N Krishna Raju, Mc Graw Hill, New Delhi.
2. CBRI Building materials and components.
3. NPTEL Lecture 31, Reinforced Soil Retaining Walls-Design and Construction Prof.Siva kumar Babu, IISc, Bangalore.
4. Prefab Architecture, a guide to modular design & construction, Ryan E Smith, John Wiley Publishers.

OPEN ELECTIVE – IV

(B).ADVANCED DRAWING FOR CIVIL ENGINEERING

VIII SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:

The objective of this course is:

1. Draw different views of culverts.
2. Draws different views of T. Beam bridge
3. Draws the component parts of Public health Engineering works
4. Draws the different views of irrigation Engineering structures
5. Computer aided drawing of various irrigation structures

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1.Able to Draw different views of culverts.
2. Able to Draws different views of T. Beam bridge
3.Able to Draws the component parts of Public health Engineering works
4.Able to Draws the different views of irrigation Engineering structures
5. Able to Draft some irrigation structures with basic principles

SYLLABUS

Unit 1: Simple Culvert

Draw the plan, cross-sectional elevation and longitudinal sectional elevation of

- Pipe culvert (Single Pipe)
- R.C.C slab culvert with splayed wings

Unit 2: Bridges.

- Two-Span R.C.C T-beam bridge with square return walls.
- Two-Span R.C.C T-beam bridge with splayed wing walls and Returns walls.

Unit 3: Public health engineering drawings.

- Sanitary block of a large building showing internal water supply and sanitary fittings and plumbing fixtures (Plan & Section across each unit)
- Water supply and Sanitary connections to a residential building.
- R.C.C overhead square tank.(four columns with accessories).

Unit 4: Irrigation engineering drawings

- Earthen bunds –a) Homogeneous b) Non-Homogeneous (Zoned embankment)
- Surplus weir with splayed wing walls.
- Tank sluice with tower head.

Unit 5: Computer Aided drawing of Irrigation structures

- Surplus weir with splayed wing walls.
- Tank sluice with tower head.

TEXT BOOKS & REFERENCES:

1. Water Resources Engineering Principles and Practices by Satya Narayana Murthy Challa.
2. Civil Engineering Drawing by A. Kamala.
3. Civil Engineering Drawing by Chakraborthy.

PROJECT

VIII SEMESTER

Lecture: 0Practical - 16 Internal Marks 30

Credits:8 External Marks170

Course Content:

Project work is intended to provide training in the solution of field engineering problems involving Surveying, Planning, drawing plans, Designing, Estimating and Marking out of a Building/Highway/Irrigation/Public health project.

Project work will also include the preparation of the feasibility report for any one type of enterprise under self – employment schemes.

Students shall be divided into groups of four (or) five each and shall be assigned a problem that calls for application of the knowledge he/she acquired in the course and also which involves some extra study of reference materials.

Projects:

a) Planning and designing of a Residential Colony.
b) Multi storied Building project.
c) Industrial complex
d) Irrigation project.
e) Rural Water Supply Scheme.
f) Sanitary Engineering Scheme.
g) Bridge project.
h) Low Cost Housing Scheme.
i) Set up of a small enterprise under self-employment scheme etc.

Every student should prepare a project report and submit the same for assessment. Every student puts his share to the work in all the operations of the project. The end examination in Project work shall consist of Power point presentation and Viva-voce test to be assessed by a panel of examiners comprising of an External examiner, the Head of Section, and member of staff who guided the project as internal examiner.

Suggested Learning Outcomes:

After completion of the subject, the student shall be able to

1.1 Identify different works to be carried out in the Project.
1.2 Collect data relevant to the project.
1.3 Carry out Site Surveys.
1.4 Select the most efficient method from the available choices based on preliminary investigation.
1.5 Design the required elements of the project as per standard Practice.
1.6 Prepare working drawings for the project.
1.7 Estimate the cost of project, men, materials and equipment required.
1.8 Prepare schedule of time and sequence of operations.
1.9 Prepare project report.
1.10 Prepare C.P.M. Chart.
1.11 Collect the requirements to start a Small Enterprise/Industry under Self Employment Scheme.
1.12. Collect the necessary information to procure necessary finance, site and equipment.
1.13 Prepare the chart or model for each project.

The aim of the Project work is to develop capabilities among the students, for a comprehensive analysis of implementation of Good Hygienic Practices in conducting investigation and report writing in a systematic way and to expand students understanding on
the subject.

Computer Science & Enginerring
Course Structure
I Year, Semester- I(1st Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS1T01	HSMC	English-I	2	-	-	2	2
2	18CS1T02	BSC	Linear Algebra &Differential Equations	3	1	-	4	4
3	18CS1T03	BSC	Applied Physics	3	-	-	3	3
4	18CS1T04	ESC	Problem Solving Approaches	3	-	-	3	3
5	18CS1T05	ESC	Engineering Graphics	3	-	-	3	3
6	18CS1L06	HSMC	English Communication Skills Lab-I	-	-	2	2	1
7	18CS1L07	BSC	Applied Physics Lab	-	-	3	3	1.5
8	18CS1L08	ESC	Problem Solving Approaches Lab	-	-	3	3	1.5
9	18CS2L09	ESC	IT Workshop	-	-	2	2	1
Total Number of Credits								**20**

I Year, Semester- II(2nd Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS2T01	HSMC	English-II	1	-	**2**	3	2
2	18CS2T02	BSC	Vector Calculus & Fourier Transforms	3	-	-	3	3
3	18CS2T03	BSC	Applied Chemistry	3	-	-	3	3
4	18CS2T04	BSC	Biology for Engineers	2	-	-	2	2
5	18CS2T05	ESC	Basic Electrical & Electronics Engineering	3	-	-	3	3
6	18CS2T06	ESC	Data Structures through C	3	1	-	4	4
7	18CS2L07	BSC	Applied Chemistry Lab	-	-	3	3	1.5
8	18CS2L08	ESC	Data Structures through C Lab	-	-	3	3	1.5
9	18CS2T09	MC	Environmental Studies	-	-	2	2	-
Total Number of Credits								**20**

II Year, Semester- I(3rd Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS3T01	BSC	Probability & Statistics	3			3	3
2	18CS3T02	PCC	Object Oriented Programming	3			3	3
3	18CS3T03	PCC	Advanced Data Structures	3			3	3
4	18CS3T04	ESC	Digital Logic Design	3			3	3
5	18CS3T05	HSMC	Effective Technical Communication	3			3	3
6	18CS3L07	PCC	Object Oriented Programming Lab			4	2	2
7	18CS3L08	PCC	Advanced Data Structures Lab			4	2	2
8	18CS3L09	ESC	R programming Lab			4	2	2
9	18CS3T06	MC	Indian Constitution	2			2	--
10	18CS3L10	P	Technical Seminar	1			1	1
Total Number of Credits								**22**

II Year, Semester- II(4th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS4T01	PCC	Discrete Mathematics	2			2	2
2	18CS4T02	PCC	Database Management Systems	3			3	3
3	18CS4T03	PCC	Computer Organization & Architecture	2			2	2
4	18CS4T04	PCC	Operating Systems	3			3	3
5	18CS4T05	HSMC	Managerial Economics and Financial Analysis	3			3	3
6	18CS4T06	HSMC	Professional Ethics	3			3	3
7	18CS4L07	PCC	Operating Systems &linux programmingLab			4	2	2
8	18CS4L08	PCC	Database Management Systems Lab			4	2	2
9	18CS4L09	ESC	Python Programming Lab			4	2	2
Total Number of Credits								**22**

III Year, Semester- I (5th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1.	18CS5T01	PCC	Data Mining & Warehousing		2	1	-	3	3
2.	18CS5T02	PCC	Web Technologies		2	-	-	2	2
3.	18CS5T03	PCC	Design and Analysis of Algorithms		2	1	-	3	3
4.	18CS5T04	PCC	Formal Languages & Automata Theory		2	-	-	2	2
5.	18CS5T 05/06/07	PEC	**Program Elective-I**		2	1	-	3	3
			18CS5T05	Object Oriented Analysis and Design					
			18CS5T06	Advanced Computer Architecture					
			18CS5T07	Advanced Operating Systems					
6.	**OEC Open Elective-I**				3	-	-	3	3
7.	18CS5L16	PCC	Data Mining Lab		-	-	3	1.5	1.5
8.	18CS5L17	PCC	Web Technologies Lab		-	-	3	1.5	1.5
								Total Number of Credits	**19**

Course Structure for III Year, Semester- II (6th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1	18CS6T01	PCC	Compiler Design		2	1	-	3	3
2	18CS6T02	PCC	Computer Networks		3	-	-	3	3
3	18CS6T03	PCC	Software Engineering		3	-	-	3	3
4	18CS6T 04/05/06	PEC	**Program Elective-II**		3	-	-	3	3
			18CS6T04	Unix & Shell Programming					
			18CS6T05	Internet of Things					

			18CS6T06	Distributed Systems					
5	**OEC Open Elective-II**				3	-	-	3	3
6	18CS6L21	PCC	Computer Networks Lab		-	-	4	2	2
7	18CS6L22	PCC	Software Engineering Lab		-	-	4	2	2
8	18CS6T23	MC	Essence of Indian Traditional Knowledge		2	-	-	2	--
								Total Number Of Credits	**19**

Course Structure for IV Year, Semester- I (7th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1	18CS7T01	PCC	Big Data & Hadoop		3	-	-	3	3
2	18CS7T02	PCC	Cryptography & Network Security		2	1	-	3	3
3	18CS7T 03/04/05	PEC	**Program Elective-III**		2	1	-	3	3
			18CS7T03	Machine Learning & Deep Learning					
			18CS7T04	Soft Computing					
			18CS7T05	Data Analytics					
4	18CS7T 06/07/08	PEC	**Program Elective-IV**		3	-	-	3	3
			18CS7T06	Embedded Systems					
			18CS7T07	Software Testing Methodologies					
			18CS7T08	Software Project Management					
5	**OEC Open Elective-III**				3	-	-	3	3
6	18CS7L20	PCC	Big Data & Hadoop Lab		-	-	4	2	2
7	18CS7L21	PROJ	Mini Project /Internship		-	-	4	2	2
								Total Number Of Credits	**19**

Course Structure for IV Year, Semester- II (8th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1	18CS8T 01/02/03	PEC	**Program Elective-V**		3	-	-	3	3
			18CS8T 01	Cloud Computing					
			18CS8T 02	Mobile Computing					
			18CS8T 03	Image Processing					
2	18CS8T 04/05/06	PEC	**Program Elective-VI**		3	-	-	3	3
			18CS8T 04	Adhoc And Sensor Networks					
			18CS8T 05	Human Computer Interaction					
			18CS8T 06	Artificial Intelligence & Neural Networks					
3	**OEC Open Elective-IV**				3	-	-	3	3
4	**OEC Open Elective-V or MOOC**				2	-	-	2	2
5	18CS8L22	PROJ	Major Project		-	-	16	8	8
Total Number Of Credits									**19**

Open Elective 1

S.No	Course Code	Course Title	Offering Dept
1	18CS5T08	Employability Skills: Competitive Coding	CSE/IT
2	18CS5T09	Optimization Techniques	BED
3	18CS5T10	Electrical Engineering Materials	EEE
4	18CS5T11	Basics of Control Systems	EEE
5	18CS5T12	Design Thinking &Product Innovation	ME
6	18CS5T13	Solid State Devices and Circuits	ECE
7	18CS5T14	Principles of Communication	ECE
8	18CS5T15	Employability Skills: Quantitative Aptitude & Reasoning	BED

Open Elective II

S.No	Course Code	Course Title	Offering Dept
1	18CS6T07	Employability Skills: Quantitative Aptitude & Reasoning	BED
2	18CS6T08	Basic Civil Engineering	CE
3	18CS6T09	Sustainable Engineering Practices	CE
4	18CS6T10	Disaster Management	CE
5	18CS6T11	Low Cost Housing	CE
6	18CS6T12	Design and Estimation of Electrical Systems	EEE
7	18CS6T13	Energy Audit, Conservation and Management	EEE
8	18CS6T14	Nanotechnology	ME
9	18CS6T15	Microprocessors and microcontroller	ECE
10	18CS6T16	Embedded Systems	ECE
11	18CS6T17	Employability Skills: Competitive Coding	CSE/IT
12	18CS6T18	Computer Networks	CSE/IT
13	18CS6T19	Managerial Economics and Financial Analysis	DMS
14	18CS6T20	Cross Cultural management	DMS

Open Elective III

S.No	Course Code	Course Title	Offering Dept
1	18CS7T09	Fuzzy Sets and Fuzzy Logic	BED
2	18CS7T10	Remote sensing and GIS	CE
3	18CS7T11	Green Buildings	CE
4	18CS7T12	Electric Vehicles	EEE
5	18CS7T13	Special Electrical Machines	EEE
6	18CS7T14	Bio Medical Instrumentation	ECE
7	18CS7T15	Nano Electronics	ECE
8	18CS7T16	Software Project Management.	CSE/IT
9	18CS7T17	Computer Architecture & Organization	CSE/IT
10	18CS7T18	Technology Innovation Management	DMS
11	18CS7T19	Global Environment Trends	DMS

Open Elective IV

S.No	Course Code	Course Title	Offering Dept
1	18CS8T07	Soft Computing Techniques	ECE
2	18CS8T08	Satellite communication	ECE
3	18CS8T09	Internet of Things	CSE
4	18CS8T10	Utilization of Electrical Energy	EEE
5	18CS8T11	Mechatronics	ME
6	18CS8T12	Green Engineering Systems	ME
7	18CS8T13	Micro - Electro - Mechanical Systems	ME
8	18CS8T14	Advanced Drawing for Civil Engineers	CE
9	18CS8T15	Polymer Chemistry	BED

Open Elective V

S.No	Course Code	Course Title	Offering Dept
1	18CS8T16	Operating Systems	CSE
2	18CS8T17	Robotics	ME
3	18CS8T18	Solar Energy Systems	ME
4	18CS8T19	Power Quality	EEE
5	18CS8T20	Additive Manufacturing	ME
6	18CS8T21	Advanced Civil Engineering Technologies	CE

Note: **Open Electives shall be selected in consultation with the department and prior approval is required**

I YEAR
SEMESTER-I
SYLLABUS

ENGLISH-1

I Year – I Semester

Lecture: 2 Practical: 0 Internal Marks: 30

Credits: 2 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

CO 1: Use English language, both written and spoken, competently and correctly.

CO 2: Improve comprehension and fluency of speech.

CO 3: Gain confidence in using English in verbal situations.

CO 4: Hone the communication skills to meet the challenges of their careers very successfully.

CO 5: Strengthen communication skills in different contexts like formal and informal.

CO 6: Develop knowledge of different fields and serve the society accordingly

Syllabus:

Unit 1 Human Resources : Ideal Family

Unit 2 In London:Verger

Unit 3 Our Living Environment: Three Days to See

Unit 4 Energy: Alternative Sources: War

Unit 5 Principles of Good Writing : Letter Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: -

Course Outcomes:

1. Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations
2. Illustrate the methods of computing eigen values and eigen vectors
3. Able to analyze the real life situations, formulate the differential equations then apply the solving methods
4. Explain the techniques of solving the linear differential equations
5. Optimize functions of several variables and able to find extreme values of constrained functions

Syllabus:

UNIT I: Linear systems of equations, Eigen values & Eigen vectors

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations.Gauss -Jordan method, LU decomposition method,

Application: Finding the current inelectrical circuits, Eigen values, Eigen vectors, Properties of Eigen values(without proofs).

UNIT II: Quadratic forms & Differential calculus:

Cayley-Hamilton theorem(without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor's and Maclaurin's series.Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor's theorem for functions of two variables.

Applications: Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT III: Differential equations of first order:

Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli's equation, Exact differential equations.Equations reducible to exact equations.

Applications: Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth.

UNIT IV: Differential equations higher order:

Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x).Rules to find the particular integral(RHS term of the type e^{ax} V(x), any other function), Method of variation of parameters. **Application:** L-C-R circuits.

UNIT V: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t. Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. . P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

2.ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED PHYSICS

I Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

1: Study of lasers and optical fibers with an emphasis of their application in communication in particular.

2: Outline the principles of Quantum mechanics to understand the principles of solid state materials for use in engineering applications.

3: The Analytical study of response of materials to Electromagnetic fields.

4: To study various magnetic and dielectric materials and their Engineering applications.

5: To Gain knowledge on the physics of semiconductors for their engineering applications.

SYLLABUS

UNIT –I

LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Recording and Reconstruction of Holography- Applications.

OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Advantages of Optical Fibers in Communication – Applications in Communication.

UNIT – II

QUANTUM THEORY OF SOLIDS

Matter waves – Physical significance of wave function – Schrodinger's Time independent wave equation.Schrodinger's Time dependent wave equation - Particle in a 1 Dimensional Potential well.

UNIT-III

ELECTROMAGNETIC FIELDS

Grad – Div – Curl – Gauss and Stoke's theorems – Fundamental Laws of Electromagnetism.

Maxwell's Equations – Poynting vector – Propagation of Electromagnetic waves in a dielectric medium.

UNIT-IV

MAGNETIC MATERIALS

Origin of magnetic moment – Classification of magnetic materials (Dia, Para, Ferro) - Weiss theory of Ferromagnetic domains – Hysteresis – Soft and Hard magnetic materials - Applications.

DIELECTRIC MATERIALS

Types of Polarization – Dielectrics in DC and AC fields – Internal field –ClausiusMossoti Equation – Dielectric Loss and Dielectric Breakdown – Ferroelectric Hysteresis and applications.

UNIT-V

PHYSICS OF SEMICONDUCTORS

Carrier Concentration in Intrinsic semiconductor – Fermi level and electrical conductivity in intrinsic semiconductors - Carrier Concentration in Extrinsic semiconductors – Variation of Fermi level with temperature and impurity concentration.Drift and Diffusion currents – Einstein's relation – Hall Effect & its applications.

Text Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications
2. Engineering Physics by M.Avadhanuluand P.G. Kshirasagar – S Chand Publications (10^{th} Edition)
3. Applied Physics by S.O.Pillai – New Age Publications – (3^{rd} Edition)

Reference Books:

1. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014 Edition)
2. Engineering Physics by M.Armugam – Anuradha Publications
3. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications

Problem Solving Approaches

I Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

The student will learn

1. To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
2. To implement conditional branching, iteration and recursion.
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To use structures and files

SYLLABUS

UNIT – I:

Introduction to Computer Problem Solving: Programs and Algorithms, characteristics of an algorithm, Flowchart,Pseudo-code, TheProblem – Solving Aspect, Top-Down design

Fundamental Algorithms Introduction,Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, reversing the digits of an Integer.

UNIT – II:

Factoring Methods: Introduction,GCD of two Integers, Generating Prime numbers, Computing the Prime Factors of an Integer, Generation of pseudo-random numbers

Array Techniques: Introduction, Array Order Reversal, Finding the Maximum number in a set, Removal of duplicates from an ordered array, Partitioning an Array

UNIT-III:

Programming Languages and Introduction to C Programming: Properties of Machine Language, Assembly Language, High-Level Languages, Procedural and Object-Oriented Languages.Structure of C program, Indentation, Comments,Identifiers& variables, DataTypes

Interactive Input, Formatted Output, FormatModifiers, Operators, Operator precedence & Associativity, Relational expressions, Type Casting,Mathematical Library Functions, Selection control statements: if and switch

UNIT -IV:

Repetition structures: Basic Loop Structures: while, for , do-while, Nested loops, **Modular Programming:** Functions and parameter declarations, Returning a Value,Functions with Empty Parameter Lists,Variable Scope

Modular Programming Variable Storage Class: Local, Global,**Pointers:** declaration and its usage, Functions with parameters: pass by value, pass by address, pointer to a function and function pointer

UNIT-V:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions related to strings.

TEXT BOOKS:

[1] R.G. Dromey, "How to Solve it By Computer", Prentice-Hall International Series in Computer Science,1982.

[2] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

REFERENCE BOOKS:

[1] DENNIS M. RITCHIE, BRIAN W KERNIGHAN, " The C Programming Language", Prentice-Hall International Series in Computer Science, Second Edition.

[2] Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction toProgrammingandProblemSolvingWithPascal",JohnWileyandSonsInc ,1984.

[3] David Gries, "The Science of Programming", Springer Verlag,1981.

ENGINEERING GRAPHICS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes:

1: Draw the polygons, ellipse, parabola, hyperbola, cycloids and involutes for various types of profiles.

2: Construction of various scales like plain, diagonal and venier scales .Draw the orthographic projections of the points, lines.

3: Draw the projections of planes.

4: Draw the projections of solids

5: Convert Orthographic projections to isometric projection and vice versa.

SYLLABUS:

UNIT I:

Lettering,Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods. Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes-Tangent and Normals to the above curves.

UNIT II :

Orthographic projections: Introduction, Projections of points.

Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane, Projections of planes inclined to both the reference planes.

UNIT IV: Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

UNIT V:Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views. Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text Books:

1. Engineering Drawing, N. D. Butt, Chariot Publications
2. Engineering Drawing +Auto CAD, K Venugopal&V Prabhuraja, Newage Publishers.

Reference Books:

1. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree, K. C. John, PHI Publishers
3. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers
4. Engineering Graphics, P.I. Varghese, McGraw Hill Publishers

ENGLISH COMMUNICATION SKILLS LAB-1

I Year – I Semester

Lecture: 0 Practical: 2 Internal Marks: 40

Credits: 1 Tutorial: 0 External Marks: 60

Prerequisites: -

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1 Greetings and Introduction

2 Request Permission & Giving Directions

3 Inviting/Complaining/Congratulating

4 Root Words

5 Phonetics-Sounds and Symbols

6 Pronunciation Rules

References:

1. ***Strengthen Your Steps,*** Maruti Publications

2. ***Interact,*** Orient Blackswan

3. Word Power Made Easy, Pocket Books

APPLIED PHYSICS LAB

I Year – I Semester

Lecture: 0	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

(Any 10 of the following listed experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings - Sonometer
9. Determination of Young's modulus by method of single cantilever oscillations.
10. Melde's experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p - n junction.

Problem Solving Approaches Lab

I Year – I Semester

Lecture: 2	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

List of Experiments:

1. a. Write an algorithm, flowchart and pseudo code to perform all arithmeticoperations
   b. Write an algorithm, flowchart and pseudo code to find average of threenumbers
   c. Write an algorithm, flowchart and pseudo code to find smallest of threenumbers
2. a. Write an algorithm, flowchart and pseudo code for finding smallest divisor ofan integer.
   b. Write an algorithm, flowchart and pseudo code to find x^y
3. Write a C program to convert temperature from Fahrenheit to Celsius and viceversa.
4. Write a C program to find the roots of quadraticequation
5. Write a C program to find whether a given number isprime
6. Write a C program find whether a given number isarmstrong
7. Write a C program to display reverse of a givennumber
8. Write a C program to generate first n- terms of a fibonaccisequence.
9. Write a C program to calculate sin(x) value, where x is input given byuser
10. Write a C program to calculate cos(x) value, where x is input given byuser
11. Write a C program to perform operations on one dimensionalarray
    a. Smallest element of anarray
    b. Largest element of an array
    c. swap smallest and largest element in anarray
12. Write a C program to implement thefollowing
    a. Addition of twomatrices
    b. Multiplication of twomatrices
13. Write a C program to perform the following operations on strings without using string handlingfunctions
    a. To display length of thestring
    b. To check whether a string ispalindrome
    c. To delete n characters from a given position in a givenstring
14. Write recursive and non recursive programs for thefollowing
    a. Factorial of anumber
    b. GCD of twonumbers
    c. Fibonacciseries
15. Write a program which illustrates Storageclasses

IT WORKSHOP

I Year – I Semester

Lecture: 2 Practical: 2 Internal Marks: 40

Credits: 1 Tutorial: 0 External Marks: 60

Prerequisites: -

LIST OF EXPERIMENTS:

1. **System Assembling, Disassembling and identification of Parts / Peripherals**
2. **Operating System Installation**-Install Operating Systems like Windows, Linux .
3. **MS-Office**
   a. **Word** - Formatting, Page Borders, Reviewing, Equations, symbols.
   b. **Spread Sheet** - organize data, usage of formula, graphs, charts.
   c. **Power point** - features of power point, guidelines for preparing an effective presentation.
   d. **Access**- creation of database, validate data.
4. **Network Configuration & Software Installation**-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. **Internet and World Wide Web**-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. **MATLAB-** basic commands, subroutines, graph plotting.
8. **LATEX**-basic formatting, handling equations and images.

Text Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition by Gary B. Shelly, Misty E. Vermaat and Thomas J.
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudraprathap, Oxford University Press, 2002.
5. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
6. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
8. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

I YEAR

SEMESTER-II

SYLLABUS

ENGLISH II

I Year – II Semester

Lecture: 1	Practical: 2	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

Unit 1 Transport: Problems and Solutions

The Scarecrow

Unit 2 The Drunkard

A Village Lost to the Nation

Unit 3 Evaluating Technology

The Knowledge Society

Unit 4 Industry: Safety and Training

Martin Luther King and Africa

Unit 5 Man's Peril (Detailed)

Report Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

ENGLISH COMMUNICATION SKILLS LAB II

1	a.	Introducing Yourself and Other People
		Employability Skills
	b.	Introduction to Soft Skills
		My Skills, My Strengths
2	a.	Discussing Daily Routines
		Free Time Activities
	b.	Describing Family
		Talking about Family
3	a.	Giving Directions
		Ordering Food
	b.	Asking for and Paying the Bill
		Describing Appearances and Personality
4	a.	Writing a Product Description-1
	b.	Writing a Product Description-2
5	a.	Describing an Advertised Job
		Skills Needed for Different Jobs
	b.	What Kind of Job Are You Interested in?
		Finding out about a Job
6.	a.	Managing Nerves in a Presentation
	b.	Learning about Presentations

Reference:

Online Resources:

https://goo.gl/v57WHe

http://www.careerbuilder.co.in

https://goo.gl/w3FweC

https://goo.gl/4GoueJ etc.

VECTOR CALCULUS & FOURIER TRANSFORMS

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

UNIT I: Special functions &Multiple integrals:

Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Multiple Integrals: Double integrals in Cartesian &polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

UNIT II: Vector Calculus:

Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div& Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Vector Integration: Line integral, Green's theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

UNIT III: Fourier Series:

Euler's formulae(without proof), Conditions of a Fourier expansion, Functions having points of discontinuity.Change of interval, Even and odd functions, Half-range series.

UNIT IV: Fourier Transforms:

Fourier Integral, Fourier cosine & sine integral, complex forms of Fourier integral.

Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms(without proof), Convolution theorem(without proof), finite Fourier sine & cosine transforms.

UNIT V: Applications of Partial Differential Equations:

Definition of PDE, Classification of 2nd order PDE, Variable separable method, Vibrations of a stretched string – Wave equation.One-dimensional heat flow, Two-dimensional heat flow, Solution of Laplace's equation.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED CHEMISTRY

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

1:Study of polymers and composite materials enable us to use them in a good number of engineering fields

2: Industries are run by the quality of fuels and energy crisis can be met by broad understanding of different fuels

3: Electrochemical principles form the basis of batteries that are being developed. Destruction of metals and alloys can be prevented by understanding the science of corrosion.

4:Study of the existing developed materials forms a basis for developing more number of advanced materials

5: Methods of purification of water can be known so that more of them can be developed

6:The importance of engineering materials in the domestic and engineering fields can be understood.

SYLLABUS:

UNIT I: POLYMERS AND PLASTICS

Introduction- Degree of polymerization-functionality-tacticity-Types- Addition polymerization-Definition-PVC-Properties-applications condensation polymerization-Bakelite-Properties-applications,Physical and mechanical properties – Conducting polymers– Biodegradable polymers-applications– Natural rubber- Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol -Thermoplastics and Thermosetting plastics –- Composite materials & Fiber reinforced plastics

UNIT II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes)

Primary cells: Zinc – air cellSecondary cells:- Lithium ion batteries, Pb-acid cell,

Fuel cells:- H_2-O_2 fuel cell and molten carbonate fuel cells

Corrosion:Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating -Electroless plating

UNIT III: NON CONVENTIONAL ENERGY SOURCES

Solar Energy:- Introduction, application of solar energy, conversion of solar energy

(Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance

Non-conventional energy sources:

(i) Hydropower include setup a hydropower plant (schematic diagram)

(ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant

(iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level.

(iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation.

(v) Biomass and biofuels

UNIT IV: SEMICONDUCTORS AND SUPER CONDUCTORS

Non –Elemental Semi conductors: Stoichiometric, Non- Stoichiometric ,Controlled valency&Chalcogen photo/semiconductors- Preparation of Semiconductors Ge & Si by crystal pulling technique – purification by Zone refining.

Semiconductor Devices:- Diode –Transistor.

Super conductors*:*-Definition-Types- Characteristics –applications

UNIT V: ADVANCED MATERIALS AND GREEN CHEMISTRY

Nano materials*:*-Introduction –General methods of preparation (top down and bottom up)

Liquid Crystals-Definition, classification,applications

Green synthesis:-Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources(microwave method) -R4M4 principles-Econoburette.

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

UV Spectroscopy- Basic principle-Instrumentation- ApplicationsIR Spectroscopy- Basic principle-Instrumentation- ApplicationsNMR Spectroscopy- Basic principle-Instrumentation- Applications

Analytical techniques: FE-SEM,TEM,BETChromatography techniques: Paper chromatography, Thin layer chromatography- applications

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM

Biology for Engineers

I Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

After studying the course, the student will be able to:

1: Understand how biological observations lead to major discoveries and the morphological,Biochemical and ecological classification of organisms.

2:Understand that all forms of life have the same building blocks and their involvement in the Maintenance and metabolic processes of living organisms.

3:Classify enzymes and distinguish between different mechanisms of enzyme action andStudy the chemical reactions that are catalyzed by enzymes. Apply thermodynamic, Principles to biological systems and able to understand major chemical processes that occur, Within a living organism in order to maintain life.

4: Identify DNA as a genetic material in the molecular basis of information transfer.

5: Identify and classify microorganisms, understand media compositions and growth of Microorganisms

SYLLABUS:

Unit-1: Introduction

Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry.

Classification of organisms based on (a) Cellularity- Unicellular or Multicellular , (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

Unit-2: Biomolecules

Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function.

Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

Unit-3: Enzymes & Metabolism

Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters.\

Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

Unit-4: Information Transfer

Concept of genetic code, Molecular basis of information transfer; Transcription and translation.

Unit-5: Microbiology

Concept of species and strains, Identification of Micro organisms.

Sterilization and media compositions, Growth kinetics.

Text/Reference Books:

1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd

2) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons

3) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

5) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

Basic Electrical & Electronics Engineering

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

Unit – I: Electric Circuits

Basic definitions, Types of network elements & sources, Ohms law, Kirchhoff's laws, Series & parallel circuits.Source transformation, Network reduction reductions, Introduction to AC circuits.

Unit – II: Electrical Machines

Basic laws – Faraday's laws of electromagnetic induction, Lenz's law, Right hand thumb rule, Fleming's left hand and right hand rules,Construction, working principle and applications of DC machinesConstruction, working principle and applications of transformers, induction motor and synchronous machines.

Unit – III: Electrical Power Generation, Transmission and Distribution

Sources of Energy – conventional & non conventional, Introduction and layout of thermal, hydel power plants, Introduction and layout of nuclear power plants, solar power plants, Concepts of power transmission and distribution using single line diagram.

Unit – IV: Electrical Installations & Safety

Components of Switchgear – fuse, MCBs, types of wires & cables, earthing, different types of batteries, Elementary calculations for energy consumption and types of tariffs. Energy Conservation.Electric shock and first aid, Hazardous areas, General principles of electric safety.

Unit – V: Basic Electronic Devices and their applications

Introduction to semi-conductor physics, PN junction diode, Zener diode, Transistor - operation, characteristics and configurations, Operation of transistor as a switch. Half wave, full wave and bridge rectifier using diodes, types of filters, Zener diode as a voltage regulator, transistor as an amplifier. introduction to feed back amplifiers.

Text Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGrawHill, Second Edition

Data Structures through C

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: Problem Solving Approaches

SYLLABUS:

UNIT - I:

Sortings: Bubble sort, Insertion sort, section sort

Searching: linear search, binary search

UNIT II:

Pointers: Introduction, Pointer Arithmetic and Arrays, Memory Allocations Functions ,Compatibility, Lvalue and Rvalue, Arrays and Pointers, Passing an Array to a Function, , Array of Pointers. Pointers For Inter Function Communications, Pointers to Pointers

UNIT III:

Structures: Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

Unions: Referencing Unions, Initializers, Unions and Structures, Applications.

Text Input/output: Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

UNIT IV:

Stacks: Definition, Representing stacks, ADT Stack and its operations: Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms. Recursion, Towers of Hanoi problem.

Queues: Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

UNIT V:

Linked lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; **Doubly linked list:** operations and algorithms.

Circular Linked Lists: all operations their algorithms, Linked representation of Stack and Queue. Polynomials: Addition, Multiplication.

TEXT BOOKS:

[1] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

[2] Mark Allen Weiss,"Data structure and Algorithm Analysis in C". Addison Wesley Publication.2006.

[3] SEYMOUR LIPSCHUTZ, "Data Structures With C – by Schaum Series".

REFERENCE BOOKS:

[1] Horowitz Sahni and Anderson-Freed "Fundamentals of Data Structures in C". 2nd Edition, Universities Press,2008.

[2] Richard F. Gilberg& B. A. Forouzan "Data Structures A Pseudocode Approcah with C", Second Edition, CENGAGELearning.

Applied chemistry laboratory

I Year – II Semester

Lecture: 0	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

List of Experiments:

S.No	Name of the Experiment
1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na2CO3 and NaOH.
4	Determination of temporary and permanent hardness of water using standard EDTA solution.
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

Data Structures through C Lab

I Year – II Semester

Lecture: 0 Practical: 3 Internal Marks: 40

Credits: 1.5 Tutorial: 0 External Marks: 60

Prerequisites: C Programming

List of Experiments

1. Write C programs to sort the list of elements using followingtechniques
   a. Bubble Sortb. InsertionSortc. SelectionSort
2. Write C programs to search for an element in an array using following techniques
   a. LinearSearchb. BinarySearch
3. Write a C program to demonstrate call by value and call byreference
4. Write a C program to display student information usingstructures
5. Write a C program to count number of lines, words and characters in a file
6. Write a C program to perform stack operations usingarrays
7. Write a C program to perform queue operations usingarrays
8. Write C program to implement stackapplications.
   a. Conversion of Infix expression to postfixexpression
   b. Evaluation of postfixexpression c. Towers ofHanoi
9. Write a C program to perform circular queue operations usingarrays
10. Write a C program to implement following operations on Single Linked List
    a. Insertion b. Deletionc. Search
11. Write a C program to implement following operations on DoubleLinked List
    a. Insertion b. Deletionc.Search
12. Write a C program to implement stack operations using linkedlist
13. Write a C program to implement queue operations using linkedlist
14. Write a C program to add two polynomials using linkedlist
15. Write a C program to multiply two polynomials using linkedlist

ENVIRONMENTAL STUDIES

I Year – II Semester

Lecture: 2 Practical: 0 Internal Marks: 30

Credits: 0 Tutorial: 0 External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

1. The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
2. The concepts of the ecosystem and its function in the environment.
3.The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
4. The various attributes of the pollution and their impacts and measures to reduce or controlthe pollution along with waste management practices.
5. The environmental legislations of India and Social issues and the possible means
6. Environmental assessment and the stages involved in EIA.

SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope ofEnvironmental Studies- Importance of Environmental Studies- Need for public awareness,Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference,Earth summit

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem ,Desert ecosystem- Aquatic ecosystem: pond ,lake ecosystem- Streams ,river ecosystem, Oceans

UNIT-II :NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources-Forest resources**:** Use and over-exploitation - Deforestation-Timber extraction-Mining- Conservation-Water resources**:** Use and over utilization

of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management-Energy resources**:** renewable energy sources –solar-wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity-Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India-Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV:ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects,control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTALLEGISLATION&MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of EnvirronmentalManagement Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4.Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

II YEAR SEMESTER-I SYLLABUS

PROBABILITY AND STATISTICS

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function-Expectation-Moment Generating function-Moments and properties.Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-MomentGenerating function-Moments and properties.Continuous distribution: Normal distributions, Normalapproximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Centrallimit theorem- t-distribution- Sampling distribution of means (s unknown)- Samplingdistribution of variances -χ^2 and F-distributions- Point estimation- Maximum error ofestimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Levelof significance - One tail and two-tail tests- Tests concerning one mean and proportion, twomeans-Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve bymethod of least squares-Goodness of fit.Correlation and Regression – Properties.

Text Books:

1. **Richards A Johnson, Irvin Miller and Johnson E Freund**. Probability and Statistics for Engineering, 9th Edition, PHI.

2. **Jay l.devore,** Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

1. **ShronL.Myers, Keying Ye, Ronald E Walpole,** Probability and StatisticsEngineers and the Scientists,8th Edition, Pearson 2007.

2. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction toprobability and statistics, Cengage learning, 2009.

OBJECT ORIENTED PROGRAMMING

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Understand the principles of object oriented concepts. Define classes and objects by identifying real world entities, their properties and functionalities.
2. Reuse the existing classes by using inheritance and understand the concepts of packages and exception handling.
3. Make use of built-in classes in Java and understand the concept of thread.
4. Develop user interfaces using applets, AWT and Event handling in java.
5. Create portable GUI applictions using Swing components.

SYLLABUS:

UNIT-I:

Introduction to OOP, procedural programming language vs object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector.

UNIT-II:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

Exception handling, importance of try, catch, throw, throws and finally block, userdefined exceptions, Assertions.

UNIT-III:

Multithreading: Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-IV: Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

UNIT-V:

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List, Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

TEXT BOOKS:

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.
3. JAVA for Beginners,4e,JoyceFarrell,Ankit R. Bhavsar,Cengage Learning.
4. Object oriented programming with JAVA,Essentials and Applications, Raj Kumar Bhuyya,Selvi,Chu,TMH.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1.JavaProgramming,K.Rajkumar.Pearson
2.CoreJava,BlackBook,RNageswararao,Wiley,Dream Tech
3.Core Java for Beginners,RashmiKantaDas,vikas.
4.Object Oriented Programming Through java, P.Radha Krishna, Universities Press

ADVANCED DATA STRUCTURES

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: Data Structures

COURSE OUTCOMES:

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

1. Create hash based index for efficient search
2. Analyze the efficiency of various tree data structures
3. Understand the concept of priority queues and its applications
4. Implement tree data structures for multi-way search
5. Identify and implement shortest path in various real time problems.

SYLLABUS:

UNIT-I:

SORTING: Quick Sort, Merge Sort, External Sorting, Introduction, K-way Merging - Buffer Handling for parallel Operation.

HASHING : Introduction-Static Hashing- Hash Table- Hash Functions- Secure Hash Function- Overflow Handling- Theoretical Evaluation of Overflow Techniques

UNIT-II: TREES

Introduction, Terminology, Representation of Trees, Binary Trees, Properties of Binary Tress, Binary Tree Representations, Tree Traversal: Inorder Traversal, Preorder Traversal, Postorder Traversal, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree, AVL Trees, Insertions and Deletions.

UNIT-III: PRIORITY QUEUES (HEAPS)

Model, Simple Implementation, Binary Heap-Structure Property-Heap-Order Property-Basic Heap Operations- Other Heap Operation, Applications of Priority Queues- The Selection Problem Event Simulation Problem, Binomial Queues- Binomial Queue Structure – Binomial Queue Operation-Implementation of Binomial Queues

UNIT-IV: MULTIWAY SEARCH TREES

M-Way Search Trees, Definition and Properties- Searching an M-Way Search Tree, B-Trees, Definition and Properties- Number of Elements in a B-tree- Insertion into B-Tree- Deletion from a B-Tree- B+-Tree Definition- Searching a B+-Tree- Insertion into B+-tree- Deletion from a B+-Tree.

UNIT-V: GRAPHS

Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search, Connected Components, SpanningTrees, Minimum Cost Spanning Trees, Kruskal'S Algorithm, Prim'sAlgorithm,Sollin's Algorithm, Dijkstra's Algorithm

TEXT BOOKS:

1. Data Structures, a Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan,Cengage.

2. Fundamentals of DATA STRUCTURES in C: 2nded, , Horowitz , Sahani, Andersonfreed,UniversitiesPress

3. Data structures and Algorithm Analysis in C, 2nd edition, Mark Allen Weiss, Pearson

REFERENCE BOOKS:

1. Web : http://lcm.csa.iisc.ernet.in/dsa/dsa.html

2. http://utubersity.com/?page_id=878

3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures

4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms

5. File Structures :An Object oriented approach with C++, 3ed, Michel J Folk, Greg Riccardi, BillZoellick

DIGITAL LOGIC DESIGN

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Apply Boolean laws & theorems to digital Logic functions; simplify the Boolean functions to the minimum number of literals
2. Design different types of combinational logic circuits using Adders, Subtractors, Decoders, Multiplexers and Magnitude Comparators.
3. Design clocked sequential logic circuits using flip flops
4. Design different types of Counters, Registers.
5. Contrast Programmable logic devices(PROM, PAL, and PLA) and its design.

SYLLABUS:

UNIT I:

Number Systems and Codes: Decimal, Binary, Octal, Hexadecimal Number systems and their conversions, Complements: r's complement, (r-1)'s complement, Arithmetic additions, subtraction using the method of complements. Codes: BCD, Excess 3, Gray codes.

Boolean algebra And Logic Gates:

Digital computers and digital systems, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Digital Logic Gates, Universal gates, Canonical and standard forms, simplification of Boolean

Functions using K maps (up to five variables), Don't-Care conditions, Tabulation method, Two level NAND and NOR implementations.

UNIT II:

Combinational Logic:

Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure. Exclusive-or Gates, Parity Generators and Checkers.

Combinational Logic with MSI and LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Demultiplexers, Encoders, Multiplexers, Code Conversion.

UNIT III :

Sequential Logic: Sequential circuits, Classification, Latches, Flip Flops, Triggering of Flip-Flops, Master slave flip-flop, Flip-Flop Excitation tables, flip-flop direct inputs.

Analysis of Clocked Sequential Circuits: State table, State diagram, state equations, State Reduction and Assignment, Design Procedure, design with unused states, Design of Counters.

UNIT IV:

Registers: Register, Left Shift register, Right shift register, Bidirectional Shift register, Universal Shift register.

Counters: Design of Synchronous counters, Ripple counters, Up/Down counters, Ring counter, Johnson counter.

UNIT V:

Programmable Logic & Clock Circuits: Read – Only Memory (ROM), PROM, Programmable Logic Device (PLD), Programmable Logic Array (PLA), Programmable Array Logic (PAL), 555 timer, Astable and Monostable operations.

TEXT BOOKS

1.M.Morris Mano, Digital Logic & Computer Design 1 e/d reprint, Pearson education, 2013.
2. Roth ,Fundamentals of Logic Design, Cengage,5/e.

REFERENCE BOOKS:

1. Donald e Givone, Digital Principles and Design, TMH.
2. A.AnandKumar ,Fundamentals of Digital Circuits,4th Edition,PHI
3. ZviKohavi, Switching and Finite Automata Theory, 2nd Edition, TMH, 1978.

Humanities-I: Effective Technical Communication

II Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

SYLLABUS:

UNIT-I: Vocabulary Building

The concept of word formation
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
Synonyms, antonyms and standard abbreviations

UNIT-II: Writing Skills

Sentence structures
Use of phrases and clauses in sentences
Importance of proper punctuation
Creating coherence
Organizing principles of paragraphs in documents
Comprehension
Essay writing

UNIT-III: Identifying Common Errors in Writing

Subject-verb agreement
Noun-Pronoun agreement
Misplaced Modifiers
Articles
Prepositions
Redundancies
Clichés

UNIT-IV: Oral Communication

Common Everyday situations: Conversations and Dialogues
Communication at workplace
Interviews
Formal Presentations

UNITV: Life Skills

Self-assessment and self esteem
Attitudes, values and beliefs
Personal goal setting
Career planning
Managing Time
Complex Problem solving
Creativity

Suggested Readings:

1. Practical English usage, Michael Swan, OUP 1995
2. Remedial English Grammar, F.T.Wood.Macmillan, 2007
3. On writing well. William Zinsser, Harper Resource book, 2001
4. Study Writing, Liz-Hamp-Lyons and Ben Heasly, Cambridge University Press, 2006
5. Communication Skills, Sanjay Kumar and Pushp Latha, Oxford University press, 2011
6. Exercises in spoken English parts I-III, CIEFL, Hyderabad Oxford university press

OBJECT ORIENTED PROGRAMMING LAB

II Year – I Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling.

LIST OF LAB EXPERIMENTS:

Exercise - 1 (Basics)

a). Write a JAVA program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a). Write a JAVA program to implement Single Inheritance.

b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for "super" keyword.

b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism

b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)

a). Write a JAVA program Illustrating exception handling keywords.

b). Write a JAVA program for creation of Java Built-in Exceptions

c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class.

b). Write a program illustrating **isAlive**and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package.

c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse.

b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

ADVANCED DATA STRUCTURES LAB

II Year – I Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES: Data Structures, C/C++ programming

COURSE OUTCOMES:

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

1. Develop indices.
2. Implement various search trees.
3. Crate a graph and traverse the graph
4. Develop code for shortest path problems.

LIST OF LAB EXPERIMENTS:

1 To implementation of Quick Sort
2 To implementation of Merge Sort
3 To implementation of Static Hashing (Use Linear probing for collision resolution)
4 To implementation of Binary Search trees.
5 To perform various operations i.e., insertions and deletions on AVL trees.
6 To implement operations on binary heap.
7 To implement operations on graphs
   i) vertex insertion
   ii) Vertex deletion
   iii) finding vertex
   iv)Edge addition and deletion
8 To implementation of Breadth First Search Techniques.
9 To implementation of Depth First Search Techniques.
10 To implement Prim's algorithm to generate a min-cost spanning tree.
11 To implement Krushkal's algorithm to generate a min-cost spanning tree.
12 To implement Dijkstra's algorithm to find shortest path in the graph.

R PROGRAMMING LAB

II Year – I Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Implement the basic concepts and data structures of R.
2. Implement loops and functions in R
3. Implement mathematical functions and handling files
4. Apply the different distributions
5. Use various graphical tools in R
6. Describe the properties of discrete and continuous distribution functions

Concepts to be covered:

Introduction, How to run R, R Programming Structures, Control Statements, Loops, , Functions, Recursion, Doing Math and Simulation in R, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files, Creating Graphs, Saving Graphs to Files, Probability Distributions, Correlation and Covariance, Linear Models.

LIST OF EXPERIMENTS:

Exercise 1: Introduction to R Programming

Exercise 2: Getting Used to R: working with Data structures

Exercise 3: Using Conditional & Iterative Statements in R

Exercise 4: Working with functions

Exercise 5: Doing Math and Simulation in R

- Math Functions
- Calculus
- Linear algebraic operations
- Set operations

Exercise 6: Reading in Your Own Data

- Working with files
- Accessing the Keyboard and Monitor,

Exercise 7: Data visualization

- Charts and plots
  - Find the mean, median, standard deviation and quintiles of a set of observations.
- Students may experiment with real as well as artificial data sets.

Exercise 8: Probability Distributions.

- Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of Normal, binomial and Poisson distributions.
- Students are expected to generate artificial data using and explore various distribution and its properties. Various parameter changes may be studied.

Exercise 9: Correlation

Calculate the correlation between two variables.
Use the scatter plot to investigate the relationship between two variables

Exercise 10: Fitting a straight line of type y=a+bx

- A Statistical Model for a Linear Relationship
- The R Function: lm

TEXT BOOKS:

1) Statistical Learning using R, WHITTON

2) The Art of R Programming, A K Verma, Cengage Learning.

3) R for Everyone, Lander, Pearson

4) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCES:

1) R Cookbook, Paul Teetor, Oreilly.

2) R in Action, Rob Kabacoff, Manning

Constitution of India

II Year – I Semester

Lecture: 2	Practical: 0	Internal Marks: -
Credits: 0	Tutorial: 0	External Marks: -

PREREQUISITES: -

COURSE OUTCOMES:

At the end of the course, the student will be able to have a clear knowledge on the following:

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

SYLLABUS:

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level

Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

Technical Seminar

II Year – I Semester

Lecture: 1	Practical: 0	Internal Marks: -
Credits: 1	Tutorial: 0	External Marks: -

The Student Shall give a detailed presentation of any technical topic in the domain of Computer Science and Engineering which shall be evaluated by the Department committee.

II YEAR SEMESTER-II SYLLABUS

Discrete Mathematics

II Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

SYLLABUS:

UNIT-I

Mathematical Logic: Introduction, Statements and Notation, Connectives, Normal forms, Theory of inference for Statement Calculus, The Predicate Calculus, Inference theory of Predicate calculus.

UNIT-II

Set Theory: Introduction, Basic concepts of set theory, Principle of Inclusion and Exclusion, Properties of Binary relations, Relation matrix and Digraph, operations on relations, Partition and covering, Transitive closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, Bijective functions, Inverse functions, Composition of functions, Recursive functions, Pigeonhole principle and its applications.

UNIT-III

Algebraic Structures: Algebraic systems and examples, general properties, semigroup, monoid, groups and subgroups.

Number Theory: Properties of integers, Division algorithm, The greatest common divisor, Euclidean algorithm (without proof), Least common multiple, testing of prime numbers, The fundamental theorem of Arithmetic, Fermat's theorem and Euler's theorem (without proofs) and its applications.

UNIT-IV

Combinatorics and Recurrence Relations: Basic counting principles- sum rule, solving recurrence relations by substitution and by the method of characteristic roots.

UNIT -V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems withoutProofs).

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblayand P. Manohar, Tata McGraw Hill
3. Mathematical Foundation for Computer science, S. Santha, E.V. Prasad, Cengage publications.

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REFERENCE BOOKS:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H.Rosen, 7th Edition, Tata McGraw Hill.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler

Ross, PHI. 3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

DATA BASE MANAGEMENT SYSTEMS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Describe a database and different database models
2. Design Entity Relationship models And Relational Model
3. Design and implement queries using Structured Query Language
4. Design database schema using normalization.
5. Understand the characteristics of database transaction management.

SYLLABUS:

Unit – I:

Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, and Database applications.

Brief introduction of different Data Models- the ER Model – Relational Model – Other Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure.

Unit – II:

Entity Relationship Model: Introduction, Representation Of Entities, Attributes, Entity Set, Relationship, Relationship Set, Constraints, Sub Classes, Super Class, Inheritance, Specialization, And Generalization Using ER Diagrams.

Relational Model: Introduction to Relational Model, Concepts of Domain, Attribute, Tuple, Relation, Importance Of Null Values, Constraints (Domain, Key Constraints, Integrity Constraints) And Their Importance

Unit – III:

SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause,

arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion), Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering.

Implementation of different types of joins, view(updatable and non-updatable), relational set operations, Definition of NOSQL, History of NOSQL and Different NOSQL products, Applications, features of NoSQL, Difference between SQL and NoSQL

Unit-IV

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Indexing: Hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

Unit-V

Transaction Management And Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint, Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods: lock granularity, lock types, two-phase locking for ensuring serializability, deadlocks.

Recovery System: Introduction to ARIE, The Log, The Write-Ahead Log Protocol, check pointing, Recovery from system crash

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.

2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.

3. C.J.Date, "*Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

4. Professional NOSQL" by Shashank Tiwari, 2011, WROX Press.

REFERENCES:

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7th Edition, Pearson Education, 2000.

2. ElmasriNavrate, *"Fundamentals of Database Systems"*, 5th Edition, Pearson Education, 2007.

COMPUTER ORGANIZATION & ARCHITECTURE

II Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

PREREQUISITES: -DLD

COURSE OUTCOMES:

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

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shiftmicro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input – Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

OPERATING SYSTEMS

II Year – II Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1.Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.

2. Apply synchronization to cooperating processes and handle the deadlocks

3. Learn various management techniques for efficient utilization of system memory.

4. Understand and analyze theory andimplementation offiles and Evaluate different disk scheduling algorithms.

5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

Managerial Economics & Financial Analysis

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

COURSE OUTCOMES:

At the end of this course the student will able to:

- The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand.
- One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs.
- One has to understand the nature of different markets and Price Output determination under various market conditions.
- One should equipped with the knowledge of different Business Units
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

SYLLABUS

UNIT – I:

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Demand forecasting and its Methods.

UNIT – II:

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions- Cobb-Douglas Production function-Economics of Sale-Cost Concepts- Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis- Determination of Break-Even Point (Simple Problem).

UNIT – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements- Analysis and Interpretation of Financial Statements

Capital Budgeting: Meaning of Capital Budgeting-Need for Capital Budgeting- Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS :

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES :

1. V. Maheswari : Managerial Economics, Sultan Chand.
2. Suma Damodaran : Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. VanithaAgarwal : Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja : Financial Accounting for Managers, Pearson.
6. Maheswari : Financial Accounting, Vikas Publications.
7. S. A. Siddiqui & A. S. Siddiqui : Managerial Economics and Financial Analysis, New Age International Publishers, 2012.

PROFESSIONAL ETHICS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:

- To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
- Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Principles for Harmony
Truthfulness – Customs and Traditions – Value Education – Human Dignity – Human Rights – Fundamental Duties – Aspirations and Harmony (I, We & Nature) – Gender Bias – Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.
UNIT II: Engineering Ethics and Social Experimentation:
History of Ethics – Need of Engineering Ethics – Senses of Engineering Ethics – Profession and Professionalism – Self Interest – Moral Autonomy – Utilitarianism – Virtue Theory – Uses of Ethical Theories – Deontology – Types of Inquiry – Kohlberg's Theory – Gilligan's Argument – Heinz's Dilemma – Comparison with Standard Experiments – Learning from the Past – Engineers as Mangers – Consultants and Leaders – Balanced Outlook on Law – Role of Codes – Codes and Experimental Nature of Engineering.
UNIT III: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety – Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk – Consequences – Risk Assessment- Accountability- Liability – Reversible Effects – Threshold Levels of Risk – Delayed v/s Immediate Risk – Safety and the Engineer – Designing for Safety-Risk – Benefit Analysis- Accidents.
UNIT IV: Engineers' Duties and Rights:
Concept of Duty – Professional Duties- Collegiality- Techniques for Achieving Collegiality – Senses of Loyalty- Consensus and Controversy – Professional and Individual Rights – Confidential and Proprietary Information – Conflict of Interest – Ethical egoism – Collective Bargaining – Confidentiality – Gifts and Bribes – problem solving – Occupational Crimes – Industrial Espionage – Price Fixing – Whistle Blowing.
UNIT V: Global Issues:
Globalization and MNCs – Cross Culture Issues – Business Ethics – Media Ethics- Environmental Ethics – Endangering Lives – Bio Ethics – Computer Ethics – War Ethics – Research Ethics – Intellectual Property Rights.

Outcome:

- It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.

- It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – Tata McGraw – Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, Dharanikota Suyodhana – Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S.B.Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Enginnering Ethics & Human Values by M.Govindarajan, S. Natarajan and V.S.Senthil Kumar – PHI Learning Pvt.Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M.Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof. D.R.Kiran – Tata McGraw – Hill – 2013.
9. Human Values and Professional Ethics by Jayshree Suresh and B.S. Raghavan, S.Chand Publications.

DATA BASE MANAGEMENT SYSTEMS LAB

II Year – II Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Create own database.
2. Manipulate data in database using SQL language.
3. Experiment with various SQL queries with database created
4. Write programs using PL/SQL language.
5. Create triggers using PL/SQL.

LIST OF LAB EXPERIMENTS:

1. Introduction to SQL: DDL, DML, DCL, TCL.
2. Queries for Creating Tables with Constraints, Views.
3. Example SQL Queries using select.
4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN).
5. Queries using Group By, Order By, and Having Clauses and Working with Index, Sequence, Synonym.
6. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
7. Queries on Joins and Correlated Sub-Queries.
8. Write a PL/SQL Code using Basic Variable, Anchored declarations, and Usage of Assignment Operation.
9. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL.
10. Write a PL/SQL block using SQL and Control Structures in PL/SQL.
11. Write a PL/SQL Code using Cursors, Exceptions and Triggers.
12. Write a PL/SQL Code using Procedures, Functions, and Packages.

TEXT BOOKS :

1) ORACLE PL/SQL by example. Benjamin Rosenzweig, ElenaSilvestrova, Pearson
2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, TMH.
3) SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.
4) Data Base Management System, Oracle SQL and PL/SQL, Pranabkumar Das Gupta, P Radha Krishna, PHI.

OPERATING SYSTEMS &LINUX PROGRAMMING LAB

II Year – II Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES: C programming

COURSE OUTCOMES:

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

1. Implement various basic functionalities of operating systems

2. Illustrate kernel functionalities using LINUX

LIST OF LAB EXPERIMENTS:

Operating Systems:

1. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate Bankers Algorithm for Dead Lock Avoidance
3. Simulate Bankers Algorithm for Dead Lock Detection.
4. Simulate the placement algorithms in Multiprogramming
5. Simulate the following page replacement algorithms: a) FIFO b) LRU c) Optimal
6. Simulate the following File allocation strategies: a) Sequenced b) Indexed c) Linked

Linux Programming:

1. a) Study of Unix/Linux general purpose utility command list:man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.

   b) Study of vi editor.c) Study of Bash shell, Bourne shell and C shell in Unix operating system.

2. Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program to emulate the UNIX ls –l command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe.Ex: - ls –l | sort
5. Write a C program that illustrates two processes communicating using shared memory
6. Write a C program to simulate producer and consumer problem using semaphores

7. Write C program to create a thread using pthreads library and let it run its function.
8. Write a C program to illustrate concurrent execution of threads using pthreads library.

PYTHON PROGRAMMING LAB

II Year – II Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES:

COURSE OUTCOMES:

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

1. Structure simple Python programs for solving problems.
2. Decompose a Python program into functions.
3. Represent compound data using Python lists, tuples, and dictionaries.
4. Read and write data from/to files in Python Programs.
5. To build software for real needs.

Concepts to be covered:

- **Introduction:**Variables,Assignment,Keywords, Comments, Input-Output, Indentation
- **Types, Operators and Expressions:** Datatypes, Operators, Control flow statements
- **Data Structures:** Lists, Tuples, Sets, Dictionary,Sequences,Comprehensions
- **Functions**: Types of Arguments, Anonymous, Fruitful and Lambda Functions.
- **Python Packages**: Installation and Importing packages, Brief tour of packages like System, math, random, date and time, Numpy, Matplotlib, Multi-threading, scikit-learn and Internet Access.
- **OOPs using Python**
- **Exception handling in python**

Lab Exercises:

1. Write a program to perform various list of operations(eg: Arithmetic,logical,bitwise etc) in python.
2. Write a program to implement control flow statements.
3. Write a programs implementing various predefined function of Lists,Sets,Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.

6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors .
9. Writea program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen vales and vectors, determinant for a matrix.
12. Write a program to read a file.
13. Write a program to use System,mathetc packages.
14. Write a program for visualizing the data using matplotlibpackage .
15. Write a program to access data from the web and validate it.
16. Write a program to perform multi threading.

TEXT BOOKS

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. “Python in easy steps In Easy Steps”, Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.
6. “Introduction to Programming Concepts with Case Studies in Python”, GöktürkÜçoluk Sinan Kalkan, Springer

III YEAR

SEMESTER-I

SYLLABUS

DATA MINING & DATA WAREHOUSING

III Year - I Semester **Course Code: 18CS5T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Identify the scope and necessity of Data Mining & Warehousing for the society.

2) Describe the design of Data Warehousing so that it can be able to solve the root problems.

3) To understand various tools of Data Mining and their techniques to solve the real time problems.

4) To develop ability to design various algorithms based on data mining tools.

5) To develop further interest in research and design of new Data Mining Techniques.

COURSE OUTCOMES:

1) Design data warehouse with dimensional modeling and apply OLAP operations.

2) Understand the Data Mining Principles and need of preprocessing

3) Compare and evaluate different data mining techniques like classification and prediction.

4) Identify the frequent patterns from transactional data.

5) Compare and evaluate different clustering techniques.

SYLLABUS

UNIT-I

Data Warehouse: Basic Concepts: What is a Data Warehouse? Differences between Operational Databases system (OLTP) and Data warehouses (OLAP). Data warehousing: A Multitier Architecture, Fundamentals of ETL architecture, Data Warehouse Design Methodology, Data Warehouse Modeling: Data Cube: A Multidimensional Data Model, Data Marts and Star Schema Design.

UNIT-II

Data Mining: Introduction: Data mining on What Kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Data Objects and Attribute Types.

Data Preprocessing: Why Preprocess the Data? Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization

.**UNIT-III**

Classification and Prediction: Basic concepts: What is Classification? General Approach to solving a Classification problem. Decision Tree Induction: Working of Decision Tree, building a Decision Tree, methods for expressing an Attribute test Conditions, measures for selecting the best split, Algorithm for Decision Tree Induction.

Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification, Bayesian Belief Networks, K-Nearest-Neighbor Classifiers.

UNIT-IV

Association Analysis: Basic Concepts and Algorithms: Problem Defecation. Frequent Item Set generation: The Apriority Principle, Frequent Item set Generation in the Apriori Algorithm, Candidate Generation and Pruning, Support counting. Rule generation: Confidence- Based Pruning, Rule Generation in Apriori Algorithm. Compact Representation of Frequent Item sets: Maximal Frequent Item sets, Closed Frequent Item sets. FP-Growth Algorithm: FP Tree Representation, Frequent Itemset Generation in FP-Growth Algorithm.

UNIT-V

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm

DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.

TEXT BOOKS:

1) Jiawei Han Micheline Kamber, "Data mining & Techniques", Morgan Kaufmann Publishers.
(Units 1,2, 3)
2) Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining", Pearson Publications (Units 4, 5)

REFERENCES:

1) S.N.Sivanandam, S.Sumathi, "Data Mining – Concepts, Tasks and Techniques", Thomson
2) Ralph Kimball, "The Data Warehousing Toolkit", Wiley.
3) Margaret H. Dunham, "Data mining - Introductory and advanced topics", Pearson Education.
4) D.Hand, H. Mannila and P.Smyth, "Principles of Data mining", PHI (2001).

WEB TECHNOLOGIES

III Year - I Semester **Course Code: 18CS5T02**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web.

2) The course will introduce web-based media-rich programming tools for creating interactive web pages.

COURSE OUTCOMES:

1) Analyze a web page and identify its elements and attributes.
2) Create web pages using HTML and Cascading Styles sheets.
3) Build dynamic web pages and client-side scripts using AJAX
4) Build web applications using PHP.
5) Develop interactive web pages that include databases

SYLLABUS

UNIT-I

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.HTML Common tags: List, Tables, images, forms, frames, HTML5, Cascading Style Sheets (CSS) & its Types, Style Specification Formats, Selector Forms, CSS3 modules

UNIT-II

Java Script: Introduction to Java Script, Declaring variables, Event handlers (onclick, onsubmit, etc.,) and Form Validation. Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Pattern Matching using Regular
Expressions, DHTML: Positioning Moving and Changing Elements

UNIT-III

XML: XML Syntax, Namespace in XML, Document type Definition, XML schemas, XSLT,DOM and SAX Approaches. **AJAX A New Approach:** Introduction to AJAX.

UNIT-IV: PHP Programming:

Introducing PHP: Creating PHP script, Running PHP script, working with variables and constants: Using variables Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases.

UNIT-V

MySQL: Introduction to MySQL, Data types, Queries, Applying Filters, Usage of Grouping and Sort, SET Operators, CRUD operations, Joins, Integration of MySQL with PHP.

TEXT BOOKS:

1) Programming the World Wide Web, Robert W Sebesta, 7ed, Pearson.(Unit 1,2,3)
2) Web Technologies, Uttam K Roy, Oxford publications (Units 1,2 3)
3) The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill.(Unit 4)
3) MySQL The Complete Reference - VikramVaswani McGraw Hill.(Unit 5)

REFERENCES:

1) Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2) Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3) Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4) An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning

DESIGN AND ANALYSIS OF ALGORITHMS

III Year - I Semester **Course Code: 18CS5T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Reinforce basic design concepts (e.g., Pseudocode, specifications, top-down design)
2) Knowledge of algorithm design strategies
3) Ability to analyze time and space complexity

COURSE OUTCOMES:

1. Understand the performance Analysis of an Algorithm using Space and Time Complexities
2. Describe, apply and analyze the complexity of divide and conquer strategy.
3. Synthesize efficient Algorithms for common engineering problems using Greedy Method.
4. Apply and analyze the complexity of dynamic programming strategy.
5. Ability to solve complex problems using Back Tracking and Branch & Bound.

SYLLABUS

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Solving Recurrence relations.

UNIT-II

Divide and Conquer Method: General Method, Applications: Binary search, Quick sort, Merge sort, Defective Chessboard.

UNIT-III

Greedy Method: General method, Applications: Minimum cost spanning tree (Prim's and Kruskal's Algorithms), Single source shortest paths, Fractional Knapsack Problem, Job Sequencing with Deadlines.

UNIT-IV

Dynamic programming: General Method, Applications: Optimal Binary Search Tree, String Editing, 0/1 knapsack, Travelling salesman problem.

UNIT V

Back tracking: General Method, Applications: Sum of Subsets, Hamiltonian Cycles.

Branch and bound: General Method, Applications:0/1 Knapsack problem, travelling salesman problem.

Introduction to NP-Hard & NP-Complete Problems – Basic Concepts, Cook's Theorem.

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

REFERENCES:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

3. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. PHILearning.

FORMAL LANGUAGES & AUTOMATA THEORY

III Year - I Semester **Course Code: 18CS5T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Introduce the student to the concepts of Theory of computation in computer science.
2) The students should acquire insights into the relationship among formal languages, formal Grammars and automata.

COURSE OUTCOMES:

1) Understand the basic concepts of Automata Theory
2) Infer the equivalence of languages described by finite automata and regular expressions.
3) Devise regular, context free grammars while recognizing the strings and tokens and able to Normalize grammars.
4) Apply Pushdown Automata for problem solving.
5) Understand basic properties and compute using Turing Machines.

SYLLABUS

UNIT-I

Finite Automata: Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines.

UNIT-II

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closures Properties, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-III

Context Free Grammars: Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

UNIT-IV

Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata.

UNIT-V

Turning Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Types of Turing Machines

TEXT BOOKS:

1) Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008. (Units 1, 2, 3, 4, 5).
2) Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007. (Units (1, 2, 3, 4, 5).

REFERENCES:

1) Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2) Introduction to Automata Theory, Formal Languages and Compuation, Shyamatendukandar, Pearson, 2013.
3) Theory of Computation, V.Kulkarni, Oxford University Press, 2013.
4) Theory of Automata, Languages and Computation, Rajendra Kumar, McGrawHill.

(Program Elective-I)

OBJECT ORIENTED ANALYSIS AND DESIGN

III Year- I Semester **Course Code: 18CS5T05**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To understand how to solve complex problems.

2) Analyze and design solutions to problems using object oriented approach.

3) Study the notations of Unified Modeling Language.

COURSE OUTCOMES:

1) Understand the necessity of Object Modeling

2) Represent classes, responsibilities and states using UML notation.

3) Demonstrate knowledge about the conceptual Model of UML.

4) Model the event driven state of object and transform them into implementation specific layouts.

5) Identify, Analyze the subsystems, various components and collaborate them interchangeably.

SYLLABUS

UNIT-I

Introduction: Evolution of Object Model, Foundation of Object Model, Elements of Object Model, applying the Object Model.

UNIT-II

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT-III

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT-IV

Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

UNIT-V

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

TEXT BOOKS:

1) "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, IvarJacobson, 12th Impression, 2012, PEARSON.

REFERENCES:

1) "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning.
2) "The Unified modeling language Reference manual", James Rumbaugh, IvarJacobson, Grady Booch, Addison-Wesley.
3) "Object- Oriented Analysis & Design with Applications", Grady BOOCH, RobertA. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia. Houston, 3rd edition, 2013, PEARSON.

(Program Elective-I)

ADVANCED COMPUTER ARCHITECTURE

III Year - I Semester | Course Code: 18CS5T06

Lecture: 2 Practical: 0 | Internal Marks: 30

Credits: 3 Tutorial: 1 | External Marks: 70

COURSE OBJECTIVES:

1) The idea of Parallelism in computers.
2) The advanced concepts of computer architecture and exposing the major differentials of RISC and CISC architectural characteristics.
3) The functionalities of different memory systems and buses.
4) The features and functionalities in advanced processor architectures.
5) About the importance of multi processors and multi computers.

COURSE OUTCOMES:

1) Understand design of a computer and its Instruction Set
2) Interpret performance of different pipelined processors and memory mapping techniques.
3) Acquire in-depth knowledge of high performance instruction level parallelism.
4) Explore architectural features of advanced processors like shared memory architectures.
5) Analyze design issues of inter connection networks.

SYLLABUS

UNIT-I

Fundamentals of Computer Design: Fundamentals of Computer design, Changing faces of computing and task of computer designer, Technology trends, Cost price and their trends, Measuring and reporting performance, Quantitative principles of computer design, Amdahl's law. Instruction set principles and examples- Introduction, Classifying instruction set- Memory addressing- type and size of operands, Operations in the instruction set.

UNIT–II

Pipelines: Introduction, Basic RISC instruction set, Simple implementation of RISC instruction set, Classic five stage pipe lined RISC processor, Basic performance issues in pipelining, Pipeline hazards, and Reducing pipeline branch penalties.

Memory Hierarchy Design: Introduction, Review of ABC of cache, Cache performance, Reducing cache miss penalty, Virtual memory.

UNIT–III

Instruction Level Parallelism the Hardware Approach: Instruction-Level parallelism, Dynamic scheduling, Dynamic scheduling using Tomasulo's approach, Branch prediction, high performance instruction delivery- hardware based speculation.**ILP Software** Approach Basic compiler level techniques, Static branch prediction, VLIW approach, Exploiting ILP, Parallelism at compile time, Cross cutting issues -Hardware versus Software.

UNIT–IV

Multi Processors and Thread Level Parallelism: Multi Processors and Thread level Parallelism-Introduction, Characteristics of application domain, Systematic shared memory architecture, and Distributed shared – memory architecture, Synchronization.

UNIT–V

Inter Connection and Networks: Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster, Designing of clusters.

TEXT BOOKS:

1) John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach 5thed,Morgan Kaufmann Elsevier, 2013.

REFERENCES:

1) Computer Architecture and Parallel Processing – Kai Hwang, Faye A.Brigs., MC Graw Hill.
2) Advanced Computer Architecture – A Design Space Approach – DezsoSima, Terence Fountain, Peter Kacsuk , Pearson Ed.

(Program Elective-I)

ADVANCED OPERATING SYSTEMS

III Year - I Semester **Course Code: 18CS5T07**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The aim of this module is to study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems).

2) Hardware and software features that support these systems.

COURSE OUTCOMES:

1) Outline the potential benefits of distributed operating systems.

2) Analyze the synchronization mechanism in distributed operating systems.

3) Infer the techniques used to detect and handle deadlocks in distributed operating systems.

4) Understand the process management in distributed operating systems.

5) Explore various distributed shared memory organizations.

SYLLABUS

UNIT–I

Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues. **Communication in Distributed systems**: Layered protocols, ATM networks, the Client - Server model, remote procedure call and group communication.

UNIT–II

Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, E-tech Algorithms, the Bully algorithm, a ring algorithm, atomic transactions,

UNIT-III

Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

UNIT–IV

Processes: Processes and Processors in distributed systems: Threads, system models, Processor allocation, Scheduling in distributed system, Fault tolerance and real time distributed systems.

UNIT-V

Distributed file systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems**.**

Distributed shared memory: What is shared memory, consistency models, page based distributed shared memory, shared variable distributed shared memory, and object based DSM.

TEXT BOOKS:

1) Distributed Operating System - Andrew. S. Tanenbaum, PHI. (Units 1, 2.3).
2) Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education. (Units 4, 5).

REFERENCES:

1) Operating System Principles Abraham Silberchatz, Peter B.Galvin,Greg Gagme 7th Edition, John Wiley.
2) Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson

DATA MINING LAB

III Year - I Semester **Course Code: 18CS5L16**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

1) Practical exposure on implementation of well known data mining tasks.

2) Exposure to real life data sets for analysis and prediction.

3) Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.

4) Handling a small data mining project for a given practical domain.

COURSE OUTCOMES:

1. Learn about WEKA tool and its applications
2. Extract knowledge using Data Mining techniques.
3. Adapt to new Data Mining tools.
4. Explore recent trends in Data Mining such as Web mining, spatial-temporal mining,

LIST OF LAB EXPERIMENTS

1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using Random Tree algorithm
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k- means.

WEB TECHNOLOGIES LAB

III Year - I Semester **Course Code: 18CS5L12**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Knowledge of HTML, Java Script and XML to develop web applications

2) Understanding about JDBC connections and Java Mail API

3) Acquire Knowledge of the design and development process of a complete web application

LIST OF LAB EXPERIMENTS

1. Design the following static web pages required for an online book store web site.

i)HOME PAGE: The static homepage must contain three frames. ii) LOGIN PAGE iii) REGISTRATION PAGE IV) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.

2. Write JavaScript to validate the following fields of the Registration page.

I). FirstName (Name should contain alphabets and the length should not be less than 6 characters).

ii).Password (Password should not be less than 6 characters length).

iii). E-mailid (should not contain any invalid and must follow the standard pattern name@domain.com)

iv). Mobile Number (Phonenumbershouldcontain10digitsonly).

v).Last Name and Address (should not be Empty).

3. Develop and demonstrate the usage of inline, internal and external style sheet usingCSS

4. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

i) Input: Click on Display Date button using onclick()function Output: Display date in the textbox

ii) Input: A number n obtained using prompt Output: Factorial of n number using alert

iii) Input: A number n obtained using prompt Output: A multiplication table of numbersfrom1 to 10of n using alert

iv) Input: A number n obtained using prompt and add another number using confirmOutput: Sum of the entire n numbers using alert

5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

6. Write an HTML page including any required JavaScript that takes a number from text field in the range of0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

7. Create an XML document thatcontains10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAXparser.

8. Develop and demonstrate PHPScript for the following problems:

i) Write a PHP Script to find out the Sum of the Individual Digits.

ii) Write a PHP Script to check whether the given number is Palindrome or not

9. Implement the following web applications using (a) PHP

i) A web application that takes a name as input and on submit it shows a hello page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You message with the duration of usage (hint: Use session to store name and time).

ii) Write a PHP Program to display current Date, Time and Day.

iii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello, you are not authorized to visit the site" message, where should be replaced with the entered name. Otherwise it should send "Welcome to this site" message.

iv) A web application that lists all cookies stored in the browser on clicking"List Cookies" button. Add cookies if necessary.

10. Implement the web applications with Database using PHP

11. Modify the above PHP program to use an xmlinstead of database

12. Write a program to design a simple calculator using JavaScript and PHP

13. Installation and usage of XAMPP on the given operating system and get accustomed to usage of phpmyadmin.

14. Simple to complex queries in MySQL.

15. Examples using the integration of PHP with MySQL.

(Example1: Sign up form and login form)

(Example2: Construct a simple shopping cart by calculating price and reducing quantity dynamically.)

III YEAR

SEMESTER-II

SYLLABUS

COMPILER DESIGN

III Year – II Semester **Course Code: 18CS6T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The process involved in a compiler.
2) Create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
3) To apply the code generation algorithms to get the machine code for the optimized code.
4) What is syntax analysis, various types of parsers- top down approach, bottom up parsers.
5) Various aspects of the run-time environment into which the high-level code is translated.

COURSE OUTCOMES:

1) Acquire knowledge in different phases and passes of Compiler.
2) Demonstrate knowledge about scanning of tokens and perform the syntax analysis by using Top-down parsing techniques.
3) Perform the syntax analysis by using Bottom Up parsing techniques for more complex grammars.
4) Compare different memory management techniques in runtime environment.
5) Demonstrate knowledge about compiler generation tools and techniques.

SYLLABUS

UNIT–I

Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation.

Lexical Analysis: The role of lexical analyzer, Input buffering, specification of tokens. Recognition of tokens, The lexical analyzer generator - LEX.

UNIT–II

Syntax Analysis: The Role of a parser, Context free Grammars, Writing a grammar, Top down parsing - Backtracking, LL (1) Grammars, Recursive descent parsing, Non – recursive Predictive parsing, Error recovery in Predictive Parsing.

Bottom up parsing: Reductions, Handle Pruning, Shift – Reduce Parsing, Conflicts during Shift – Reduce Parsing,

UNIT –III

Simple LR Parser – LR Parsing Algorithm, SLR - Parsing Table, Viable Prefixes.

More Powerful LR parser – Constructing Canonical LR1, LALR parsing tables, Using Ambiguous Grammars, Error Recovery in LR parser.

UNIT – IV

Intermediated Code Generation: Variants of Syntax trees, 3 Address code – Quadruples, Triples.

Runtime Environments: Stack allocation of space, Access to Non Local data on the stack, Heap Management.

UNIT – V

Code Generation: – Issues in design of code generation, the target Language, peephole Optimization, A simple Code Generator. Basic Blocks & Flow Graphs, Optimization of Basic Blocks – DAGs, Local Common sub expression elimination.

Machine independent code optimization:

The principle sources of Optimization: Global Common sub expression elimination - Constant folding - Copy propagation - Dead code elimination – Induction Variable & Strength reduction - Loop optimization - Procedure in-lining.

TEXT BOOKS:

1. Compilers – Principles, Techniques and Tools. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffery D. Ullman, 2nd edition, Pearson - 2007.

REFERENCE BOOKS:

1. Compiler Construction, Principles and practice, Kenneth C Louden, CENGAGE

2. Implementations of Compiler, A New approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

3. LEX & YACC – John R. Levine, Tony Mason, Doug Brown, O'reilly

4. Principles of compiler design, 2nd edition, Nandhini Prasad, Elsevier.

COMPUTER NETWORKS

III Year - II Semester **Course Code: 18CS6T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4) Learn various IEEE standards for medium access.
5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP
2) Identify the different types of network topologies and protocols.
3) Compare and contrast methods to identify Errors and correct them.
4) Differentiate between various network routing algorithms.
5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOTWARE ENGINEERING

III Year - II Semester **Course Code: 18CS6T03**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To grasp generic models to structure the software development process.
2) To understand core concepts of requirements engineering and requirements specification.
3) To recognize different notion of complexity at both the module and system level.
4) To be aware of some widely known design methods.
5) To understand the role and contents of testing activities in different life cycle phases.

COURSE OUTCOMES:

1) Understand the perspective of various software process models
2) Understand the Requirements Engineering Process and compile an SRS
3) Analyze the requirements and perform a Design
4) Apply testing principles on software project and understand the maintenance concepts.
5) Identify risks, manage the change to assure quality in software projects

SYLLABUS

UNIT-I

The Evolving Role of Software – Software – The changing Nature of Software – Legacy software — A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process.

UNIT-II

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams,

Designing the architecture. Assessment: Impact of Requirement Engineering in their problem. Decision Tables, SRS Document, IEEE Standards for SRS, Design: Architectural design, component level design, user interface design.

UNIT-III

Requirements Analysis – Analysis Modeling Approaches: Design Engineering – Design Process -Design Quality - Design Model - User Interface Design

Design: Modeling with UML, Use case Diagrams, Class Diagrams, Object Diagrams, Sequence Diagrams, Collaboration Diagrams, Component Diagrams, Deployment Diagrams

Coding standards, Coding Guidelines, Modern Programming Language features, Documentation Guidelines

UNIT-IV

Implementation and Testing: Quality concepts, Review techniques, Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing, Software Testing Strategies - Strategies: Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Testing conventional applications, Testing object oriented applications, and Testing Web applications.

UNIT-V

Project Management Concepts, Process and Project Metrics, Estimation for Software projects, Software Cost Estimation, Project Scheduling, Risk Management, Maintenance and Reengineering. Assessment: Preparation of Risk mitigation plan.

TEXT BOOKS:

1. “Fundamentals of Software Engineering”, Rajib Mall, PHI Publication, 3rdedition.(Units 1,2,5)
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley.(Units 3,4)
3. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning(Units 3,5)

REFERENCES:

1. Roger S. Pressman, -Software Engineering: A Practitioner‘s Approach‖, McGraw Hill International edition, Seventh edition.

2. Stephan Schach, ―Software Engineering‖, Tata McGraw Hill.
3. Ian Sommerville, Software Engineering, 9th Edition, Pearson Publishers.

(Program Elective-II)

UNIX & SHELL PROGRAMMING

III Year - II Semester **Course Code: 18CS6T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Written technical communication and effective use of concepts and terminology.
2) Facility with UNIX command syntax and semantics.
3) Ability to read and understand specifications, scripts and programs.
4) Individual capability in problem solving using the tools presented within the class
5) Students will demonstrate a mastery of the course materials and concepts within in class discussions.

COURSE OUTCOMES:

1) Create powerful data processing applications using UNIX shell and commands
2) Manage data, files and programs at command line using UNIX
3) Create and modify data files and documents using editors and tools
4) Demonstrate knowledge of creating new commands.
5) Develop Scripts and programs that demonstrate effective use of structured programming.

SYLLABUS

UNIT-I

Introduction to UNIX-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-PATH, man, echo, who, date, stty, pwd ,cd, mkdir, rmdir, cp, mv, rm, cat, more, wc, tar, kill, sleep.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, ls command with options-File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Introduction to Basic Regular Expressions -The Grep Command with options-EGrep and FGrep Commands, The Stream Editor Sed Command with options-The AWK command- awk preliminaries, awk using print and printf.

UNIT-IV

Simple Filtering commands: pr, cmp, comm, diff, head tail, cut, paste, sort - Meta characters-Creating New Commands - More on I/O Redirection- Command Substitution-Giving Multiple commands- Command Line Structure.

UNIT-V

Shell Programming-Shell Variables-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The Sleep Command-Debugging Scripts-The Script Command.

TEXT BOOKS:

1. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.(Units 1,2,3,4,5)
2. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.(Unit 2,4)

REFERENCE BOOKS:

1. Unix and shell programming by B.M. Harwani, OXFORD university press.
2. UNIX and Shell Programming by Behrouz A. Forouzan, Richard F. Gilverg

(Program Elective-II)

INTERNET OF THINGS

III Year - II Semester **Course Code: 18CS6T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on-Approach”, VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, “Getting Started with Raspberry Pi”, O’Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram “ Internet of Things” Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, John Wiley andSons2014.

(Program Elective-II)

DISTRIBUTED SYSTEMS

III Year - II Semester **Course Code: 18CS6T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To learn the principles, architectures, algorithms and programming models used in distributed systems.
2) To examine state-of-the-art distributed systems concepts of operating system, Middleware.

COURSE OUTCOMES:

1) Differentiate between various System Models
2) Infer the importance of Inter process Communication in Distributed Systems.
3) Understand concepts of RMI and RPC
4) Demonstrate Knowledge of operating system support in distributed systems.
5) Understand various methods of concurrency control in Distributed Transactions.

SYLLABUS

UNIT-I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges. **System Models**: Introduction, Architectural and Fundamental models- Interaction Model.

UNIT-II

Inter Process Communication: Introduction, The API for the internet protocols-The Characteristics of Inter process communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling, Client-Server Communication, Group Communication.

UNIT-III

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications.

UNIT-IV

Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads. Communication and Invocation

UNIT-V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control. **Distributed Transactions**: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1) Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4th Edition,2009.

REFERENCES:

1) Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition, PHI.
2) Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor &Fransis Group, 2007.
3) Ajay D Kshemkalyani, Mukesh Sighal, “Distributed Computing, Principles, Algorithms and Systems”,Cambridge.

COMPUTER NETWORKS LAB

III Year - II Semester **Course Code: 18CS6L21**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Practical orientation of networking concepts
2) To teach students various forms of IPC through UNIX and socket Programming

LIST OF LAB EXPERIMENTS

1) Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(), connect(), send(), recv(),sendto(),recvfrom()).
2) Implement the data link layer farming methods such as character stuffing and bit stuffing.
3) Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4) Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
5) Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node usingdistance vector routing algorithm
6) Take an example subnet of hosts. Obtain broadcast tree for it.
7) Design TCP iterative Client and server application to reverse the given input sentence
8) Design UDP Client and server application to reverse the given input sentence
9) Implementation of getsockopt (), setsockopt () system calls.
10) Implementation of SMTP.

SOFTWARE ENGINEERING LAB

III Year - II Semester **Course Code: 18CS6L12**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Prepare SRS document, design document, test cases and software configuration management and risk management related document.
2) Develop function oriented and object oriented software design using tools like rational rose.
3) Design and develop Test Cases for a system
4) Track the progress of a project using various tools.

LIST OF LAB EXPERIMENTS

1) Create the problem statement for a specific system of relevance
2) Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3) To carry out the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4) To draw UML Diagrams for a suggested system
5) To illustrate the test cases, test case preparation and perform Manual Tests.
6) Perform Estimation of effort using FP Estimation for chosen system.
7) To prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Note: Students shall prepare a document related to all the above activities for at least one real time Case Study

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

III Year - II Semester **Course Code: 18CS6T23**

Lecture: 2 Practical: 0

Credits: 0 Tutorial: 0

COURSE OBJECTIVES:

1) The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2) To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3) The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4) To know the student traditional knowledge in different sector.

COURSE OUTCOMES:

1) Understand the concept of Traditional knowledge and its importance
2) Know the need and importance of protecting traditional knowledge
3) Know the various enactments related to the protection of traditional knowledge.
4) Understand the concepts of Intellectual property to protect the traditional knowledge
5) Evaluate strategies to increase the protection of TK.

SYLLABUS

UNIT-I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

Legal framework and TK:A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);**B:**The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

UNIT-IV

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

REFERENCES:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

IV YEAR
SEMESTER-I
SYLLABUS

BIG DATA & HADOOP

IV Year - I Semester **Course Code: 18CS7T01**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Optimize business decisions and create competitive advantage with Big Data analytics
2) Introducing Java concepts required for developing map reduce programs
3) Derive business benefit from unstructured data
4) Imparting the architectural concepts of Hadoop and introducing map reduce paradigm

COURSE OUTCOMES:

1) Understand methods for data summarization, query, and analysis.
2) Apply data modeling techniques to large data sets
3) Creating applications for Big Data analytics
4) Building a complete business data analytic solution.
5) Understand programming tools PIG & HIVE in Hadoop eco-system.

SYLLABUS

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; **Generics:** Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Data node, Secondary Name node, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

UNIT-V

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

TEXT BOOKS:

1) Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC (Unit 1)
2) Hadoop: The Definitive Guide by Tom White, 3 Edition, O'reilly(Unit 2,3,4)
3) Hadoop in Action by Chuck Lam, MANNING Publ.9(Unit 2)
4) Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss (Unit 5)

REFERENCE BOOKS:

1) Hadoop in Practice by Alex Holmes, MANNING Publ.
2) Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne

CRYPTOGRAPHY & NETWORK SECURITY

IV Year - I Semester **Course Code: 18CS7T02**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Classical systems, symmetric block ciphers (DES, AES, other symmetric ciphers)
2) Public-key cryptography (RSA, discrete logarithms)
3) Algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes,
4) Email and web security.

COURSE OUTCOMES:

1) Understand the need of information security andits importance.
2) Apply symmetric security mechanisms for confidentiality
3) Apply asymmetric security mechanisms for confidentiality
4) Apply digital signature techniques for authentication
5) Understand network security designs using available secure solutions (such asPGP, SSL, IPSec)

SYLLABUS

UNIT-I

Introduction: Security Goals, Cryptographic Attacks, Services and Mechanisms, Techniques

Mathematics of Cryptography: Integer Arithmetic, Modular Arithmetic, Matrices , Linear Congruence,

Traditional Symmetric Key Ciphers: Introduction, Cipher Model, Substitution ciphers, Transportation cipher, Stream and Block Ciphers.

UNIT-II

Symmetric Key Encryption:

Mathematics of Cryptography- Algebraic Structures, GF Fields

Modern Symmetric Key Cryptography: Modern Block Ciphers, Modern Stream ciphers

Data Encryption Standard: DES Structure, DES Analysis, Multiple DES, Security of DES

Advanced Encryption Standard: Introduction, Transformations, Key Expansion, Analysis of AES.

UNIT-III

Asymmetric Key Cryptography:

Mathematics of Cryptography: Primes, Primality Testing, Factorization, Chinese Remainder Theorem.

Asymmetric Key Cryptography: Introduction, RSA Cryptosystems, Rabin Cryptosystems, ELGAMAL Cryptosystem, Elliptic Curve CryptoSystem.

UNIT- IV

Data Integrity, Digital Signature Schemes & Key Management:

Message Integrity and Message Authentication

Cryptographic Hash Functions:Introduction, SHA-512, Whirlpool

Digital Signature: Comparison, Process, Services, Attacks on Digital Signature, Digital Signature Shemes

Key Management: Symmetric Key Distribution, Kerberos, Symmetric key Agreement, Public Key Distribution.

UNIT -V

Security at application layer: PGP and S/MIME,

Security at the Transport Layer: SSL and TLS- SSL Architecture, Four Protocols, SSL Message Formats, Transport layer Security

Security at the Network Layer: IPSec- Two modes, Two Security Protocols, Security Association, security policy, Internet Key Exchange

TEXT BOOKS:

1) Cryptography and Network Security, Behrouz A Forouzan, Debdeep Mukhopadhyay, (3e)
Mc Graw Hill. (Units 1, 2, 3, 4, 5)

REFERENCE BOOKS:

1) Cryptography and Network Security, William Stallings, (6e) Pearson.
2) Network Security and Cryptography, Bernard Meneges, Cengage Learning.
2) Everyday Cryptography, Keith M.Martin, Oxford.

(Program Elective-III)

MACHINE LEARNING & DEEP LEARNING

IV Year - I Semester **Course Code: 18CS7T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To introduce students to the basic concepts and techniques of Machine Learning and deep learning.
2) To develop skills of using recent deep learning software for solving practical problems.
3) To gain experience of doing independent study and research.

COURSE OUTCOMES:

1) Understand the basic concepts of concept learning
2) Understand the concepts of evaluating the hypothesis
3) Understand the concept behind neural networks for learning non-linear functions.
4) Develop a deep neural network for image classification
5) Develop a deep network for sequence data analysis

SYLLABUS

UNIT-I

Introduction: Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning.

Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.

UNIT-II

Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.

Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting.

UNIT-III

Artificial Neural Networks: Introduction, Neural Network representation, Perceptrons, multi-layer perceptron, Feed forward neural network, Training Neural Network: Risk minimization, loss function, regularization, model selection, and optimization, Back propagation with case study.

UNIT-IV

Deep Learning: Deep Feed Forward network, regularizations, training deep models, dropouts, Convolution Neural Network.

UNIT-V

Recurrent Neural Network, Auto encoders Introduction to Deep Learning Tools: Tensor Flow, keras.

TEXT BOOKS:

1) Tom M. Mitchell, "Machine Learning" , India Edition 2013, McGraw Hill Education (Unit 1, 2, 3)
2) Huan Liu and Hiroshi Motoda, "Feature Selection For Knowledge Discovery And Datamining" ,Springer Science + Business Media, LLC 1998. (Unit 2)
3) Cha Zhanga and YunqianMa , "Ensemble Machine Learning Methods and Applications", Springer Science + Business Media, LLC 2012 (Unit 2)
4) Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016. (Unit 4)

REFERENCES:

1. Deep Learning with python by Francois Chollet, Manning Publications.
2. Hands-on Machine Learning with Scikit-learn and TensorFlow by AurelienGeron, O'Reilly Media,2017
3. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

Program Elective-III

SOFT COMPUTING

IV Year - I Semester **Course Code: 18CS7T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Soft computing refers to principle components like fuzzy logic, probabilistic computing, evolutionary computing and genetic algorithm, which have their roots in Artificial Intelligence.
2) Healthy integration of all these techniques has resulted in extending the capabilities of the technologies to more effective and efficient problem solving methodologies.

COURSE OUTCOMES:

1) Understand soft computing Vs hard computing
2) Interpret fuzzy systems
3) Apply Adaptive Resonance Theory
4) Analyze and Apply genetic Algorithms
5) Explain fundamentals of differential evolution.

SYLLABUS

UNIT-I

Introduction: What is Soft Computing? Importance of Soft Computing, Properties of Soft Computing methods, Difference between Hard and Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.

UNIT-II

Fuzzy Set Theory: Fuzzy Versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations (Text Book 1)

Fuzzy Systems: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based Systems, Defuzzification Methods.

UNIT-III

Adaptive Resonance Theory: Introduction, ART1: Architecture of ART1, Special features fo ART1 Models,ART1 Algorithm, Illustration, ART2: Architecture of ART2, ART2 Algorithm, Illustration, Applications: Character Recognition using ART1, Classification of Soil.

UNIT-IV

Genetic Algorithm: Introduction, Biological Background, Traditional Optimization and Search Techniques, Genetic Algorithm and Search Space, Genetic Algorithm vs. Traditional Algorithms, Basic Terminologies in Genetic Algorithm, Simple GA, General Genetic Algorithm, Operators in Genetic Algorithm, Stopping Condition for Genetic Algorithm Flow, Constraints in Genetic Algorithm, Problem Solving Using Genetic Algorithm, Advantages and Limitations of Genetic Algorithm .

UNIT-V

Differential Evolution Algorithm: Differential Evolution – Process Flow and Operators, Selection of DE Control Parameters, Schemes of Differential Evolution, Numerical Illustration of DE Algorithm for a Simple Function Optimization, Applications of Differential Evolution.

TEXT BOOKS:

1. S.Rajasekaran, G.A. Vijayalakshmi Pai, Neural Networks, fuzzy logic, and genetic algorithms - Genetic Algorithm, PHI Learning Private Limited- 2010. (Unit 2, 3,4).
2. S.N.Sivanandam, S.N.Deepa Wiley India , Principles of SOFT COMPUTING, Second Edition 2011.(Unit 1, 5)

REFERENCES:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India.
2. SimanHaykin,”NeuralNetowrks”Prentice Hall of India. 3. Kumar Satish, “Neural Networks” Tata Mc Graw Hill.

(Program Elective-III)

DATA ANALYTICS

IV Year - I Semester **Course Code: 18CS7T05**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1. To understand Data Analytics lifecycle and Business Challenges.
2. To understand Analytical Techniques
3. To understand various tools and technologies to handle big data

COURSE OUTCOMES:

1. Understand big data and data analytics life cycle.
2. Explore various supervised learning methods.
3. Explore various unsupervised learning methods.
4. Understand and apply ARIMA model on time series data.
5. Learn various technology and tools in big data analytics.

SYLLABUS

UNIT-I

Introduction to Big Data Analytics: Big Data Overview, State of the Practice in Analytics, Key Roles for the new big data Ecosystem, Examples of Big Data Analytics.

Data Analytics Life Cycle: Data Analytics life cycle Overview, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize, Case Study.

UNIT-II

Supervised Learning: Decision Trees – Overview of Decision Trees, The General Algorithm, Decision Tree Algorithms, Evaluating a Decision Tree. **Naive Bayes:** Baye's Theorem, Naïve Baye's Classifier, Diagnostics of Classifiers.

Regression –Linear Regression, Logistic Regression.

UNIT-III

Unsupervised Learning: Association Rule Mining–Overview, Apriori Algorithm, Evaluation of Candidate Rules, Applications of Association Rules.

Cluster Analysis –Overview of Clustering, k-means

UNIT IV

Time Series Analysis: Overview of Time Series Analysis, ARIMA Model

Text Analysis: Text Analysis Steps, Example, Collecting Raw Data, Representing Text, TFIDF, Categorizing Documents by Topics, Determining Sentiments, Gaining Insights.

UNIT-V

Technology and Tools: MapReduce and Hadoop- Analytics for Unstructured Data, The Hadoop Ecosystem

In-DataBase Analytics: SQL Essentials, In-Database Text Analysis, Advanced SQL.

TEXT BOOKS:

1. David Dietrich, Barry Hiller, "Data Science and Big Data Analytics", EMC education services, Wiley publications, 2012.

REFERENCE BOOKS:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.

2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O" Reilly, 2011.

3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

(Program Elective-IV)

EMBEDDED SYSTEMS

IV Year - I Semester **Course Code: 18CS7T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Technology capabilities and limitations of the hardware, software components
2) Methods to evaluate design tradeoffs between different technology choices.
3) Design Methodologies.

COURSE OUTCOMES:

1) Program an embedded system
2) Design, implement and test an embedded system.
3) Identify the unique characteristics of real-time systems
4) Explain the general structure of a real-time system
5) Define the unique design problems and challenges of real-time systems.

SYLLABUS

UNIT-I

Introduction to Embedded systems: What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples?

UNIT-II

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-IV

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, and Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

(Program Elective-IV)

SOFTWARE TESTING METHODOLOGIES

IV Year - I Semester **Course Code: 18CS7T07**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2) To Understand different levels of Testing
3) Apply Black Box and White Box Testing Techniques
4) To learn how to plan a test project, design test cases and data, conduct testing operations, and generate a test report.
5) To understand software test automation problems and solutions.

COURSE OUTCOMES:

1) Have an ability to apply software testing knowledge and engineering methods.
2) Ability to identify the needs of software test automation, and define a test tool to support test automation.
3) Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
4) Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
5) Apply techniques and skills to use modern software testing tools to support software testing projects.

SYLLABUS

UNIT-I

Software Testing: Introduction, Evolution, Dichotomies, Goals & Typical Objectives of Testing, Model for testing, Software Testing Principles, **Software Testing Terminology and Methodology:** Software Testing Terminology, Errors, Defects, Failures, Root Causes and Effects, Software Testing Life Cycle, Software Testing Methodology.

UNIT-II

Verification and Validation: Verification & Validation Activities, Categories of Test Techniques: Dynamic Testing,

Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing,

White-Box Testing: Need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing

UNIT-III

Experience Based Testing Techniques: Error Guessing, Exploratory Testing, Checklist- based Testing

Static Testing: Inspections, Structured Walkthroughs, Technical reviews, Benefits of Static Testing, Static Vs Dynamic Testing.

Levels of Testing: Unit testing, Integration Testing,. Function testing, System testing and Acceptance testing.

Regression testing: Progressive Vs Regressive testing, Objectives of regression testing, Regression testing techniques

UNIT-IV

Test Management: Test Organization, Test Planning, Test Design and Test case specifications, Structure of a Testing Group, Reasons for the growth of a Test suite, Test suite Minimization, Test suite prioritization, Types of test case prioritization, prioritization techniques, Measuring the effectiveness of a prioritized test suite.

Debugging: Debugging process, Debugging Techniques, Correcting Bugs, Debuggers

UNIT-V

Automation and Testing Tools: Need for automation, Testing Tool Considerations, Test Tool Classification, Benefits and Risks of Test automation, Special Considerations for Test execution and Test Management Tools, Principles for tool selection, Testing tools- success factors, Guidelines for automated testing, overview of some commercial testing tools.

TEXT BOOKS:

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition. (Unit 1)
2. Software Testing, Principles and Practices, Naresh Chauhan, Oxford Publishers(Unit 2,3,4,5)

REFERENCES

1. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH

(Program Elective-IV)

SOFTWARE PROJECT MANAGEMENT

IV Year - I Semester **Course Code: 18CS7T08**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure.

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases

Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis.

Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT-IV

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT-V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality, Quality plan of ACIC project

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson. (Units 1, 2, 3, 4, 5)
2. Software Project Management, Walker Royce: Pearson Education (Units 4, 5)

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

BIG DATA & HADOOP LAB

IV Year - I Semester **Course Code: 18CS7L20**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Preparing for data summarization, query and analysis.
2) Applying data modeling techniques to large data sets.
3) Creating applications for Big data Analytics.
4) Building a complete business data analytic solution.

LIST OF LAB EXPERIMENTS

Week 1, 2:

1. Implement the following Data structures in Java

a)Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3, 4:

2. (i) Perform setting up and Installing Hadoop in its three operating modes:

- Standalone,
- Pseudo distributed,
- Fully distributed
- (ii)Use web based tools to monitor your Hadoop setup.

Week 5:

3. Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files
- Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 6:

4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Week 7:

5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

Week 8:

6. Implement Matrix Multiplication with Hadoop Map Reduce

Week 9, 10:

7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 11, 12:

8. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

MINI PROJECT/INTERNSHIP

IV Year - I Semester **Course Code: 18CS7L21**

Lecture: 0 Practical: 4 **Internal Marks: 100**

Credits: 2 Tutorial: 0 **External Marks:**

- The students are expected to take up an internship program with prior approval from the Department committee after III Year II Semester during the summer break which will be evaluated in the IV Year I Semester. The Internship program shall be for duration of 4 to 6 Weeks.
- The student shall submit a letter of Successful completion of the internship from the organization and present the work carried out to the evaluation committee.
- If the student was unable to take up in the internship program he/she has to take up a project work and will be evaluated in this semester by the Department Internal Evaluation Committee
- Continues evaluation will be done for 40 Marks and final evaluation will be done for 60 Marks

IV YEAR
SEMESTER-II
SYLLABUS

Program Elective-V

CLOUD COMPUTING

IV Year - II Semester **Course Code: 18CS8T01**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Explain the technology and principles involved in building a cloud environment
2) Apply Map-Reduce concept to applications.
3) To implement Virtualization
4) Contrast various programming models used in cloud computing
5) Choose appropriate cloud model for a given application.

COURSE OUTCOMES:

1) Explain and characterize different cloud deployment models and service models
2) Understand different cloud programming platforms and tools\
3) Illustrate Virtualization for Data-Center Automation.
4) Identify the security issues in cloud computing
5) Understand various basic concepts related to cloud computing technologies

SYLLABUS

UNIT-I

Introduction and Evolution of Computing Paradigms: Overview of Existing Hosting Platforms, Cluster Computing, Grid Computing, Utility Computing, Autonomic Computing, Green Computing, Cloud Computing, history and evolution, practical applications of cloud computing for various industries, IoT, economics and benefits of cloud computing, spot markets, pricing models, Supercomputing-on-demand.

UNIT-II

Cloud Issues and Challenges: Cloud computing issues and challenges like Security, Elasticity, Resource management and Scheduling, QoS (Quality of Service) and Resource Allocation, Cost Management, Big Data, Pre-reservation and Cloud bursting.

Cloud Computing Architecture: Cloud Architecture model, Types of Clouds: Public Private & Hybrid Clouds, Cloud based services: Iaas, PaaS and SaaS.

UNIT-III

Data Center: Classic Data Center, Virtualized Data Center (Compute, Storage, Networking and Application), Business Continuity in VDC.

Virtualization: Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization: Resource Virtualization i.e. Server, Storage and Network virtualization, Migration of processes, VMware vCloud – IaaS

UNIT-IV

Cloud based Data Storage: Introduction No-SQL databases, Map-Reduce framework for Simplified data processing on Large clusters using Hadoop, Design of data applications based on Map Reduce in Apache Hadoop, Task Partitioning, Data partitioning, Data Synchronization, Distributed File system, Data Replication , Shared access to weakly consistent to data stores

UNIT-V

Classification of Cloud Implementations: Amazon Web Services, The Elastic Compute Cloud (EC2), The Simple Storage Service (S3), The Simple Queuing Services (SQS), Google AppEngine - PaaS, Windows Azure, Aneka, Hadoop, Microsoft Dynamics CRM, A Comparison of Cloud Computing Platforms.

TEXT BOOKS:

1. Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, Cloud Computing: Principles and paradigms, MIT Press (2011). (Units 1,2)
2. Cloud Computing: A practical Approach Anthony Velte, Toby Velte and Robert Elsenpeter by Tata McGrawHill (2009). (Unit 5)
3. Michael Miller, Cloud Computing, Que Publishing (2008).(Unit 3,4)

REFERENCES:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, F Halper, Cloud Computing for dummies (2009).
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier
4. Hwang, Kai, Jack Dongarra, and Geoffrey C. Fox. Distributed and cloud computing: from parallel processing to the internet of things. Morgan Kaufmann, 2013.

Program Elective-V

MOBILE COMPUTING

IV Year - II Semester **Course Code: 18CS8T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.

2) To understand the typical mobile networking infrastructure through a popular GSM protocol.

3) To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer.

4) To understand the database issues in mobile environments & data delivery models.

5) To understand the ad hoc networks and related concepts.

COURSE OUTCOMES:

1) Develop new mobile applications.

2) Identify solutions to the technical issues in the mobile communication paradigm.

3) Understand the ad hoc network applications and/or algorithms/protocols.

4) Understand & develop any existing or new protocol related to mobile environment.

5) Understand the platforms and protocols used in mobile environment

SYLLABUS

UNIT–I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT–II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT–III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT-V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.(Units 1,2,3)
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772(Units 4,5)

REFERENCES:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, “Mobile Computing, Technology Applications and Service Creation” Second Edition, McGraw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, “Principles of Mobile Computing,” Second Edition, Springer.

(Program Elective-V)

IMAGE PROCESSING

IV Year - II Semester **Course Code: 18CS8T03**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To comprehend the relation between human visual system and machine perception and processing of digital images.
2) To provide a detailed approach towards image processing applications like enhancement, segmentation, and compression.

COURSE OUTCOMES:

1) Explore the limitations of the computational methods on digital images.
2) Understand the spatial and frequency domain image transforms on enhancement and restoration of images.
3) Elaborate understanding on image enhancement techniques.
4) Understand Morphological Image Processing techniques
5) Define the need for compression and evaluate the basic compression algorithms.

SYLLABUS

UNIT-I

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT-II

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering. Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT-III

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, thresholding, Region Oriented Segmentation.

Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT-V

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008 (Units 1, 2, 3)
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- MC GRAW HILL 2010(Units 3, 4, 5)

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - ScotteUmbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, MC GRAW HILL EDUCATION, 2010.
3. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
4. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2 nd Edition.

(Program Elective-VI)

ADHOC AND SENSOR NETWORKS

IV Year - II Semester **Course Code: 18CS8T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Understanding of wireless adhoc and sensor networks.
2. Enable to recognize the wide range of applicability of these networks
3. Provide them with an understanding of the major design issues including topics such as protocol mechanisms and resource constraints.

COURSE OUTCOMES:

1) Understand the Fundamental Concepts and applications of ad hoc and wireless sensor network
2) Describe the MAC protocol issues of ad hoc networks.
3) Describe routing protocols for ad hoc wireless networks with respect to TCP design issues.
4) Explain the concepts of network architecture and MAC layer protocol for WSN
5) Discuss the WSN routing issues by considering QoS measurements.

SYLLABUS

UNIT-I

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs - Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, Other routing algorithms.

UNIT-II

Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting - TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT-III

Basics of Wireless Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT-IV

Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, **Sensor Networks and mobile robots -Security:** Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT-V

Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms - Operating System: TinyOS - Imperative Language: nesC, **Dataflow style language:** TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3 (Units 1,2,3)

2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)(Units 4, 5)

REFERENCE BOOKS:

1.Carlos De Morais Cordeiro, Dharma Prakash Agrawal “Ad Hoc & Sensor Networks: Theory and Applications”, World Scientific Publishing Company, 2nd edition, 2011.

2.Feng Zhao and LeonidesGuibas, "Wireless Sensor Networks", Elsevier Publication

3.Holger Karl and Andreas Willig “Protocols and Architectures for Wireless Sensor Networks”, Wiley, 2005 (soft copy available)

4.Kazem Sohraby, Daniel Minoli, &TaiebZnati, “Wireless Sensor Networks Technology, Protocols, and Applications”, John Wiley, 2007. (soft copy available)

5.Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.(soft copy available)

(Program Elective-VI)

HUMAN COMPUTER INTERACTION

IV Year - II Semester | Course Code: 18CS8T05

Lecture: 3 Practical: 0 | Internal Marks: 30

Credits: 3 Tutorial: 0 | External Marks: 70

COURSE OBJECTIVES:

1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. To make the student think constructively and analytically about how to design and evaluate interactive technologies.

COURSE OUTCOMES:

1) Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
2) Apply an interactive design process and universal design principles to designing HCI systems.
3) Understand the importance of Natural Languages in computing interactions.
4) Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
5) Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

SYLLABUS

UNIT-I

Introduction: Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession.

Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues.

UNIT-II

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

UNIT-III

Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

UNIT-IV

Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

UNIT-V

User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process.

TEXT BOOKS:

1. Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson (Units 1, 2, 3, 4)

2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech. (Unit 5)

REFERENCE BOOKS:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

2. Designing the user interface. 4/e, Ben Shneidermann , PEA.

3. User Interface Design, Soren Lauesen , PEA.

4. Interaction Design PRECE, ROGERS, SHARPS, Wiley.

(Program Elective-VI)

ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

IV Year - II Semester **Course Code: 18CS8T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

Students will try to learn:

1. To conceptualize the basic ideas and techniques underlying the design of intelligent systems.
2. To make students understand advanced representation formalism and search techniques.
3. Develop the skills to gain a basic understanding of artificial neural networks

COURSE OUTCOMES:

1. Develop a basic understanding of AI building blocks presented in intelligent agents.
2. Choose an appropriate problem solving method and knowledge representation technique for searching.
3. Represent & Reasons logical Agents.
4. Use neural networks for practical applications such as Pattern Recognition problem
5. Apply appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

SYLLABUS

UNIT-I

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT–II

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT–III

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in proposional logic, Resolution, Forward & Backward Chaining. First

order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT–IV

Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

UNIT–V

Feed forward Neural Networks:

Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks.

Feedback Neural Networks: Introduction, Analysis of Linear Auto associative FF Networks, Analysis of Pattern Storage Networks

TEXT BOOKS :

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education. (Units 1, 2)
2. Artificial Neural Networks B. Yagna Narayana, PHI (Units 3, 4, 5)

REFERENCES :

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems – Patterson PHI.
3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.
5.Neural Networks Simon Haykin PHI
6. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

MAJOR PROJECT

IV Year - II Semester **Course Code: 18CS8L22**

Lecture: 0 Practical: 6 **Internal Marks: 40**

Credits: 8 Tutorial: 0 **External Marks: 60**

- **The Student takes up a project work along with the four subjects mentioned. The project shall have two evaluations**
  - Internal Evaluation – Continues Internal evaluation will be done for 40 Marks
  - External Evaluation – Will be performed by an External Examiner for 60 Marks

Open Elective Syllabus

Employability Skills: Competitive Coding

Open Elective I

Lecture: 2 Practical: 2 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

COURSE OBJECTIVES:

2) To give an understanding of programming concepts.
3) To get the student prepared for various coding contests conducted as part of their recruitment process

COURSE OUTCOMES:

1) Understand and Apply the fundamental concepts of various programming Languages.
2) Apply Recursion to various problems.
3) Assess the Efficiency of Algorithms.
4) Apply Search and Sort Techniques.
5) Apply Data Structures for Problem Solving.

SYLLABUS

Unit I:
What is Competitive Programming, Various Programming Contests?
Programming Techniques: Programming Language Features, Input & Output, Working with Numbers, Control Structures, Understanding and displaying various patterns, shortening the code: Examples

Unit II:
Recursive Algorithms: Generating Subsets, Generating Permutations, Backtracking, Bit Manipulations, Representing Sets. Examples

Unit III:
Algorithm Efficiency: Time complexity, Rules for calculating Time complexity, calculating Time complexity, Estimating Efficiency of Algorithms: Examples

Unit IV:
Sorting and Searching: Implementing the sorting Algorithms, Solving problems by sorting-Scheduling events, Tasks and Deadlines, Implementing Binary Search, Finding the optimal solutions: Examples

Unit V:

Data Structures: Applying Linear and Non Linear Data Structures: Stacks, Queues, Linked Lists, Priority Queues, Hash Tables, Trees, Graphs - Examples

Programming Languages to Discuss: C , C++, Java

Students must solve at least 100 problems in CodeChef / HackerRank, etc. The category may be under Easy / Medium. Problems to be solved in C,/C++/ Java or Python.

A minimum of 10 problems shall be solved per week in either CodeChef / HarckerRank, etc. The contests hosted in CodeChef / HackerRank, etc,. may be taken as day to day assessment of laboratory which will be evaluated for 30 Marks The work will be carried out in the laboratory slot allotted as well as at the home. Final Evaluation shall be done internally for 70 Marks.

TEXTBOOKS & REFERENCES

1) Halim, Steven and Halim, Felix, Competitive Programming 3, 2013.
2) Ahmed Shamsul Arefin, Art of Programming Contest, ACMSolver, Second Edition, 2012
3) Programming Challenges: The Programming Contest Training Manual By Steven S Skiena, Miguel A. Revilla
4) Guide to Competitive Programming: Learning and Improving Algorithms Through Contests By Antti Laaksonen
5) Cracking the Coding Interview 6th Edition. GAYLE LAAKMANN MCDOWELL
6) C++ Complete Reference- 4th Edition- Herbert Schildt- TMH
7) Introduction to Programming Languages - Arvind Kumar Bansal.

COMPUTER NETWORKS

Open Elective II

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4) Learn various IEEE standards for medium access.
5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP
2) Identify the different types of network topologies and protocols.
3) Compare and contrast methods to identify Errors and correct them.
4) Differentiate between various network routing algorithms.
5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOFTWARE PROJECT MANAGEMENT

Open Elective

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure.

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases

Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis.

Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT-IV

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT-V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality, Quality plan of ACIC project

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson. (Units 1, 2, 3, 4, 5)
2. Software Project Management, Walker Royce: Pearson Education (Units 4, 5)

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

COMPUTER ORGANIZATION & ARCHITECTURE

Open Elective III

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

PREREQUISITES: -DLD

COURSE OUTCOMES:

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

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shiftmicro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input –Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

INTERNET OF THINGS

Open Elective IV

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram " Internet of Things" Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley andSons2014.

OPERATING SYSTEMS

Open Elective V

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1.Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.

2. Apply synchronization to cooperating processes and handle the deadlocks

3. Learn various management techniques for efficient utilization of system memory.

4. Understand and analyze theory andimplementation offiles and Evaluate different disk scheduling algorithms.

5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

ELECTRONICS & COMMUNICATION ENGINEERING
COURSE STRUCTURE
B. Tech I Semester

S. No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC1T01	HSMC	English	2	-	-	2	2
2	18EC1T02	BSC	Linear Algebra & Differential Equations	3	1	-	4	4
3	18EC1T03	BSC	Applied Physics	3	-	-	3	3
4	18EC1T04	ESC	Problem solving through C and Python	3	-	-	3	3
5	18EC1T05	ESC	Engineering Graphics	3	-	-	3	3
6	18EC1L06	HSMC	English Communication Skills Lab-1	-	-	2	1	1
7	18EC1L07	BSC	Applied Physics Lab	-	-	4	4	2
8	18EC1L08	ESC	Problem solving through C and Python Lab	-	-	4	4	2
9	18EC1T09	MC	Environmental Studies	2	-	-	2	-
							Total number of credits	**20**

Course Structure
B. Tech II Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC2T01	HSMC	English-II	1	-	**2**	3	2
2	18EC2T02	BSC	Numerical Methods &Vector Calculus	3	-	-	3	3
3	18EC2L03	BSC	Applied Chemistry	3	-	-	3	3
4	18EC2T04	BSC	Biology for Engineers	2	-	-	2	2
5	18EC2T05	ESC	Basic Electronics & Electrical Engineering	3	-	-	3	3
6	18EC2T06	ESC	Data Structures using C	2	-	-	2	2
7	18EC2L07	BSC	Applied Chemistry Lab	-	-	3	3	1.5
8	18EC2L08	ESC	Basic Electronics & Electrical Engineering Lab	-	-	4	4	2
9	18EC2L09	ESC	Data Structures using C Lab	-	-	3	3	1.5
							Total number of credits	**20**

Course Structure for B. Tech III Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC3T01	BSC	Probability Theory & Stochastic Processes	3	1	**0**	3	4
2	18EC3T02	PCC	Electronic Circuit Analysis	3	0	**0**	3	3
3	18EC3T03	PCC	Digital Electronics	3	0	0	3	3
4	18EC3T04	ESC	Network Theory	3	0	0	3	3
5	18EC3T05	PCC	Signals & Systems	3	0	0	3	3
6	18EC3T06	HSMC	Managerial Economics & Finance Analysis	3	0	0	3	3
7	18EC3L07	PCC	Electronic Circuit Analysis Lab	0	0	3	3	1.5
8	18EC3L08	PCC	Signals & Systems Lab	0	0	3	3	1.5
9	18EC3N09	MC	Constitution of India	2	0	0	2	0
							Total number of credits	**22**

Course Structure for B. Tech IV Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC4T01	HSMC	Humanities (Effective Technical Communication)	3	0	0	3	3
2	18EC4T02	BSC	Physics of Materials	2	0	0	2	2
3	18EC4T03	PCC	Analog IC Applications	3	0	**0**	3	3
4	18EC4T04	PCC	Digital System Design Using HDL	3	0	0	3	3
5	18EC4T05	PCC	Electromagnetic Waves & Transmission lines	3	0	0	3	3
6	18EC4T06	PCC	Control Systems	3	0	0	3	3
7	18EC4L07	PCC	Analog IC Applications Lab	0	0	3	3	1.5
8	18EC4L08	PCC	Digital System Design Using HDL Lab	0	0	3	3	1.5
9	18EC4L09	Project	Mini Project	0	0	4	4	2
							Total number of credits	**22**

Course Structure for B. Tech V Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC5T01	PCC	Analog and Digital Communications	3	0	0	3	3
2	18EC5T02	PCC	Microcontroller and Microprocessors	3	0	0	3	3
3	18EC5T03	PCC	Digital Signal Processing	3	0	0	3	3
4	18EC5T04	HSMC	IPR & Patents	2	0	0	2	2
5	18EC5T05 18EC5T06 18EC5T07	OEC	Open Elective-1	3	0	0	3	3
6	18EC5L08	PCC	Microcontroller and Microprocessors Lab	0	0	3	3	1.5
7	18EC5L09	PCC	DSP Lab	0	0	3	3	1.5
8	18EC5L10	PCC	Communication Systems Lab	1	0	2	3	2
9	18EC5N11	MC	Essence of Indian Traditional Knowledge	2	-	-	2	0
							Total number of credits	**19**

Course Structure for B. Tech VI Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC6T01	PCC	VLSI Design	3	0	0	3	3
2	18EC6T02	PCC	Antenna and wave propagation	3	0	0	3	3
3	18EC6T03 18EC6T04 18EC6T05	PEC	Professional Elective1	3	0	0	3	3
4	18EC6T06	ESE	OOPS Through JAVA	3	0	0	3	3
5	18EC6T07 18EC6T08 18EC6T09	OEC	Open Elective-2	3	0	0	3	3
6	18EC6L10	PCC	VLSI LAB	1	0	2	3	1.5
7	18EC6L11	ESE	OOPS Through JAVA LAB	1	0	2	3	1.5
8	18EC6P11	Projects	Technical Seminar	1	0	0	1	1
							Total number of credits	**19**

Course Structure for B. Tech VII Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contac t Hours	Credits
				Lecture	Tutorial	Practical		
1	18EC7T01	PCC	Digital Image Processing	3	0	0	3	3
2	18EC7T02	PCC	Microwave Engineering	3	0	0	3	3
3	18EC7T03 18EC7T04 18EC7T05	PEC	Professional Elective-2	3	0	0	3	3
4	18EC7T06 18EC7T07 18EC7T08	PEC	Professional Elective-3	3	0	0	3	3
5	18EC7T09 18EC7T10 18EC7T11	OEC	Open Elective-3	3	0	0	3	3
6	18EC7L12	PCC	Microwave & OC LAB	1	0	2	3	2
7	18EC7P13	Projects	INDUSTRIAL INTERNSHIP	0	0	2	2	2
							Total number of credits	**19**

Course Structure for B. Tech VIII Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contac t Hours	Credits
				Lectu re	Tutori al	Practic al		
1	18EC8T01	PCC	Coding Theory & Techniques	3	0	0	3	3
2	18EC8T02 18EC8T03 18EC8T04	PEC	Professional Elective-4	3	0	0	3	3
3	18EC8T05 18EC8T06 18EC8T07	OEC	Open Elective-4	3	0	0	3	3
4	18EC8T08 18EC8T09 18EC8T10	OEC5/ MOOCS	Data Communication& Networking Renewable Energy sources twork Security & Cryptography	2	0	0	2	2
5	18EC8P11	PROJECTS	PROJECT	0	0	16	16	8
6	18EC8L12	Lab course	Comprehensive Viva Voice					0
							Total number of credits	**19**

LIST OF OPEN ELECTIVES

OPEN ELECTIVE-I **(V SEM)**

S No	Course Code	Title of the Course	Offered by Dept	Chosen by
1	18EC5T05	Quantitative Aptitude & Reasoning	BED	ECE
2	18EC5T06	Solid State Devices and Circuits	ECE	ECE,EEE
3	18EC5T07	Principals of Communication	ECE	EEE,CSE

OPEN ELECTIVE-II **(VI SEM)**

S No	Course Code	Title of the Course	Offered by Dept	Chosen by
1	18EC6T07	Employability skills 2	BED	ECE
2	18EC6T08	Computer Networks	CSE	ECE
3	18EC6T09	Embedded Systems	ECE	CSE

OPEN ELECTIVE-III **(VII SEM)**

S No	Course Code	Title of the Course	Offered by Dept	Chosen by
1	18EC7T09	Computer Architecture & Organization	CSE	ECE
2	18EC7T10	Bio Medical Instrumentation	ECE	ECE,EEE,CSE,ME
3	18EC7T11	Nano Electronics	ECE	ECE,CSE,EEE

OPEN ELECTIVE-IV **(VIII SEM)**

S No	Course Code	Title of the Course	Offered by Dept	Chosen by
1	18EC8T05	Operating Systems	CSE	ECE
2	18EC8T06	Soft Computing Techniques	ECE	ECE,CSE,EEE
3	18EC8T07	Mechatronics	ECE	ME

LIST OF PROFESSIONAL ELECTIVES

PROFESIONAL ELECTIVE-I **(VI SEM)**

S No	Course Code	Title of the Course
1	18EC6T03	Cellular Mobile Communication
2	18EC6T04	Internet of Things
3	18EC6T05	Digital Signal Processor and Architecture

PROFESSIONAL ELECTIVE-II **(VII SEM)**

S No	Course Code	Title of the Course
1	18EC7T03	Wireless Sensor Network
2	18EC7T04	Radar Engineering
3	18EC7T05	Embedded Systems

PROFESSIONALELECTIVE-III **(VII SEM)**

S No	Course Code	Title of the Course
1	18EC7T06	Satellite Communication
2	18EC7T07	Consumer Electronics
3	18EC7T08	Optical Communication

PROFESSIONAL ELECTIVE-IV **(VIII SEM)**

S No	Course Code	Title of the Course
1	18EC8T02	Spread Spectrum Communication
2	18EC8T03	Statistical Signal Processing
3	18EC8T04	Electronic Measurements & Instrumentation

SEMESTER- I

SYLLABUS

18EC1T01: ENGLISH-1

Scheme and Credits: L:2 T:0 P:0 C:2

Prerequisites: -

Course Outcomes

1. CO 1: Use English language, both written and spoken, competently and correctly.
2. CO 2: Improve comprehension and fluency of speech.
3. CO 3: Gain confidence in using English in verbal situations.
4. CO 4: Hone the communication skills to meet the challenges of their careers very successfully.
5. CO 5: Strengthen communication skills in different contexts like formal and informal.
6. CO 6: Develop knowledge of different fields and serve the society accordingly

Syllabus:

Unit 1 Human Resources

Ideal Family

Unit 2 In London

Verger

Unit 3 Our Living Environment

Three Days to See

Unit 4 Energy: Alternative Sourcesb) War

Unit 5 Principles of Good Writing

Letter Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

18EC1T02: LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS

Scheme and Credits: L:3 T:1 P:0 C:4

Prerequisites: -

Course Outcomes:

- Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations
- Illustrate the methods of computing eigen values and eigen vectors
- Able to analyze the real life situations, formulate the differential equations then apply the solving methods
- Explain the techniques of solving the linear differential equations
- Optimize functions of several variables and able to find extreme values of constrained functions

Syllabus:

UNIT I: Linear systems of equations, Eigen values & Eigen vectors

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations. Gauss - Jordan method, LU decomposition method, **Application:** Finding the current in electrical circuits, Eigen values, Eigen vectors, Properties of Eigen values (without proofs).

UNIT II: Quadratic forms & Differential calculus:

Cayley-Hamilton theorem (without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor‘s and Maclaurin‘s series. Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor‘s theorem for functions of two variables. **Applications:** Maxima and Minima of functions of two variables, Lagrange‘s method of undetermined multipliers.

UNIT III: Differential equations of first order:

Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli‘s equation, Exact differential equations. Equations reducible to exact equations, **Applications:** Orthogonal Trajectories, Newton‘s Law of cooling, Rate of decay & growth.

UNIT IV: Differential equations higher order:

Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x). Rules to find the particular integral (RHS term of the type e^{ax} V(x), any other

function), Method of variation of parameters. **Application:** L-C-R circuits.

UNIT V: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t. Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rdEdition, 2014.
2. B. V. RAMANA**,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi
2. Publications, 9th Edition, 2014.
3. ERWIN KREYSZIG**,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

18EC1T03: APPLIED PHYSICS

Scheme and Credits: L:3 T:0 P:0 C:3

Prerequisites: -

Course Outcomes

CO1: Study of lasers and optical fibers with an emphasis of their application in communication in particular.

CO2: Outline the principles of Quantum mechanics to understand the principles of solid state materials for use in engineering applications.

CO3: The Analytical study of response of materials to Electromagnetic fields.

CO4: To study various magnetic and dielectric materials and their Engineering applications.

CO5: To Gain knowledge on the physics of semiconductors for their engineering applications.

UNIT –I

LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Recording and Reconstruction of Holography-Applications.

OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Advantages of Optical Fibers in Communication – Applications in Communication.

UNIT – II

QUANTUM THEORY OF SOLIDS

Matter waves – Physical significance of wave function – Schrodinger‘s Time independent wave equation.Schrodinger‘s Time dependent wave equation - Particle in a 1 Dimensional Potential well.

UNIT-III

ELECTROMAGNETIC FIELDS

Grad – Div – Curl – Gauss and Stoke‘s theorems – Fundamental Laws of Electromagnetism.

Maxwell‘s Equations – Poynting vector – Propagation of Electromagnetic waves in a dielectric medium.

UNIT-IV

MAGNETIC MATERIALS

Origin of magnetic moment – Classification of magnetic materials (Dia, Para, Ferro) - Weiss theory of Ferromagnetic domains – Hysteresis – Soft and Hard magnetic materials - Applications.

DIELECTRIC MATERIALS

Types of Polarization – Dielectrics in DC and AC fields – Internal field – Clausius Mossoti Equation – Dielectric Loss and Dielectric Breakdown – Ferroelectric Hysteresis and applications.

UNIT-V

PHYSICS OF SEMICONDUCTORS

Carrier Concentration in Intrinsic semiconductor – Fermi level and electrical conductivity in intrinsic semiconductors - Carrier Concentration in Extrinsic semiconductors – Variation of Fermi level with temperature and impurity concentration. Drift and Diffusion currents – Einstein's relation – Hall Effect & its applications.

Text Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications
2. Engineering Physics by M.Avadhanulu and P.G. Kshirasagar – S Chand Publications (10th Edition)
3. Applied Physics by S.O.Pillai – New Age Publications – (3rd Edition)

Reference Books:

1. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014 Edition)
2. Engineering Physics by M.Armugam – Anuradha Publications
3. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications

18EC1T04: Problem Solving through C and Python Scheme and

Credits: L:3 T:0 P:0 C:3

Prerequisites: -

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
- To use structures and files

Syllabus:

UNIT I

INTRODUCTION TO COMPUTERS

Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process.

BASICS OF C PROGRAMMING:

Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT II

Decision making statements: if, if else, nester if. Muti way decision making statements: else if, Switch statement **Looping statements**: while, do while, for, Compilation process

UNIT III

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, Two dimensional arrays, Matrix Operations, Multi dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT IV FUNCTIONS

Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion , Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS

Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation.

UNIT V

STRUCTURES AND UNIONS

Structure , Nested structures , Pointer and Structures , Array of structures , Example Program using structures and pointers , Self referential structures, Unions.

INTRODUCTION TO PYTHON PROGRAMMING

Programming Using the REPL (Shell), Running Python Scripts, Variables, Assignment, Keywords, Input- Output, Indentation. Data Types, Operators, Expressions and order of evaluations, Control Flow- if, if- elseif-else

Text Books:

1. Reema Thareja, ―Programming in C‖, Oxford University Press, Second Edition, 2016.
2. Krnighan. B.W and Ritche, D.M, ―The C Programming Language‖, Second Edition, Pearson Education, 2006
3. Pradep dey, Manas Ghosh, ―Fundamentals of Computing and programming in C‖, First Edition, Oxford University Press, 2009.
4. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

References:

1. Paul Deitel and Harvey Deitel, ―C How to Program‖, Seventh Edition, Pearson Publication.
2. E Balagursamy, ―Programming in C, Sixth Edition, Tata McGraw Hill.
3. Ajay Mittal, ―Programming in _C‘ A practical Approach‖, Pearson education
4. Learning Python, Mark Lutz, Orielly

18EC1T05: ENGINEERING GRAPHICS

Scheme and Credits: L:3 T:0 P:0 C:3 Prerequisites: -

Course Outcomes:

CO1: Draw the polygons, ellipse, parabola, hyperbola, cycloids and involutes for various types of profiles. **CO2**: Construction of various scales like plain, diagonal and venier scales .Draw the orthographic projections of the points, lines.

CO3: Draw the projections of planes.

CO4: Draw the projections of solids

CO5: Convert Orthographic projections to isometric projection and vice versa.

Syllabus:

UNIT I:

Lettering, Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods.

Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes- Tangent and Normals to the above curves.

UNIT II:

Orthographic projections: Introduction, Projections of points.

Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane. Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane, Projections of planes inclined to both the reference planes.

UNIT IV: Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

UNIT V: Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views. Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text Books:

1. Engineering Drawing, N. D. Butt, Chariot Publications
2. Engineering Drawing +Auto CAD, K Venugopal &V Prabhuraja, Newage Publishers.

2**Reference Books:**

1. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree, K. C. John, PHI Publishers
3. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers
4. Engineering Graphics, P.I. Varghese, McGraw Hill Publishers

18EC1L06:ENGLISH COMMUNICATION SKILLS LAB-1

Scheme and Credits: L:0 T:0 P:2 C:1 Prerequisites: -

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1. **Greetings and Introduction**
2. **Request Permission & Giving Directions**
3. **Inviting/Complaining/Congratulating**
4. **Root Words**
5. **Phonetics-Sounds and Symbols**
6. **Pronunciation Rules**

References:

1. ***Strengthen Your Steps*,** Maruti Publications
2. ***Interact*,** Orient Blackswan
3. ***Word Power Made Easy***, Pocket Books

18EC1T07: APPLIED PHYSICS LAB

Scheme and Credits: L:0 T:0 P:3 C:2

Prerequisites: -

(Any 10 of the following listed experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton‘s rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings - Sonometer
9. Determination of Young‘s modulus by method of single cantilever oscillations.
10. Melde‘s experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee‘s apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p - n junction.

18EC1L08: Problem Solving Lab using C and Python

Scheme and Credits: L:0 T:0 P:4 C:2

Prerequisites: - Syllabus:

1. Write a C program to convert temperature from Fahrenheit to Celsius.

a. Write a C program to find the roots of a quadratic equation.

b. Write a program to implement simple calculator using switch case

2. Write a C program to determine if the given number is a prime number or not. Write a program to display the factorial of a given number

3. Write a program to display whether a given is Armstrong or not

Write a C program to generate the first n terms of the Fibonacci sequence.

4. Write a C program to display the reverse of a given number.

Write a C program to calculate the following sin and cos value

5. Write a program for sorting numbers in a list.

6. Write programs for searching a number in the list using

a. Linear search

b. Binary search

7. Write programs that reads two matrices to perform the following:

a. Addition of two matrices

b. Multiplication of two matrices

8. Write a program to perform the following operations without using build in string operations:

a. To display the length of the string.

b. To check whether the string is palindrome or not

c. To delete n characters from a given position in a given string.

9. Write a program to generate GCD of two numbers using functions

10. Write a C program that reads two integers n and r to compute the ncr value using the following relation: $n_{cr}(n, r) = n! / r! (n,r)!$. Use a function for computing the factorial value of an integer.

11. Write programs for the following using recursive functions

    a. Factorial of a given number

    b. GCD of two numbers

c. Fibonacci series

12. Write a program to demonstrate call by value and call by reference.
13. Write a program to perform following operating using pointers
    a. Reverse of a string
    b. Comparison of two strings
14. Write a program for displaying the details of the student by sorting them according to the marks using structure containing roll no, name and marks.
15.
    a. Running instructions in Interactive interpreter and a Python Script
    b. Write a program to purposefully raise Indentation Error and correct it

16..
    a. Write a python program to compute distance between two points taking input from the user(Pythagorean Theorem)
    b. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

17. Write a Program for checking whether the given number is an even number or not.

18EC1T09: ENVIRONMENTAL STUDIES

Scheme and Credits: L:2 T:0 P:0

C:0 Prerequisites: -

Course Outcomes

- **CO1** The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
- **CO2** The concepts of the ecosystem and its function in the environment
- **CO3** The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
- **CO4** The various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
- **CO5** The environmental legislations of India and Social issues and the possible means to
- **CO6** Environmental assessment and the stages involved in EIA.

Syllabus

UNIT-I MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of **Environmental** Studies- Importance of **Environmental** Studies- Need for public awareness,Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference,Earth summit.

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem, Desert ecosystem- Aquatic ecosystem: pond, Lake Ecosystem- Streams, river ecosystem, Oceans

UNIT-II : NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources- Forest resources**:** Use and over-exploitation- Deforestation-Timber extraction-Mining- Conservation- Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management- Energy resources**:** renewable energy sources –solar-wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal- petroleum-natural gas-Nuclear energy

UNIT-III: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity- Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India- Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV: ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects, control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTAL LEGISLATION &MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of Environmental Management Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

SEMESTER-II

SYLLABUS

18EC2T01: ENGLISH II

Scheme and Credits: L:1 T:0 P:2 C:2 Prerequisites: -

Syllabus:

Unit 1 **Transport: Problems and Solutions The Scarecrow**

Unit 2 **The Drunkard**

A Village Lost to the Nation

Unit 3 **Evaluating Technology The Knowledge Society**

Unit 4 **Industry: Safety and Training Martin Luther King and Africa**

Unit 5 **Man's Peril (Detailed) Report Writing**

References:

1. **English for Engineers and Technologists,** Orient Blackswan
2. **Prose for Communication,** Ravindra Publishing House
3. **Panorama,** Oxford University Press

ENGLISH COMMUNICATION SKILLS LAB II

1	**a.**	Introducing Yourself and Other People
		Employability Skills
	b.	Introduction to Soft Skills
		My Skills, My Strengths
2	a.	Discussing Daily Routines
		Free Time Activities
	b.	Describing Family
		Talking about Family
3	a.	Giving Directions
		Ordering Food
	b.	Asking for and Paying the Bill
		Describing Appearances and Personality
4	a.	Writing a Product Description-1
	b.	Writing a Product Description-2
5	a.	Describing an Advertised Job
		Skills Needed for Different Jobs
	b.	What Kind of Job Are You Interested in?
		Finding out about a Job
6.	a.	Managing Nerves in a Presentation
	b.	Learning about Presentations

Reference:

Online Resources:

https://goo.gl/v57WHe http://www.careerbuilder.co.in https://goo.gl/w3FweC https://goo.gl/4GoueJ etc.

18EC2T02: NUMERICAL METHODS &VECTOR CALCULUS

Scheme and Credits: L:3 T:0

P:0 C:3 Prerequisites: -

Syllabus:

UNIT I: Numerical Solution of Equations:

Solution of Algebraic and transcendental equations: Bisection method, Method of false position and Newton-Raphson method (one variable).Newton-Raphson method (non-linear simultaneous equations), Iterative methods of solution of linear simultaneous equations: Jacobi‘s and Gauss-Seidel iteration methods.

UNIT II: Numerical Integration & Numerical Solution of ODE:

Numerical Integration: Trapezoidal rule, Simpson‘s 1/3rd and 3/8th rules.**Numerical Solution of ODE:** Picard‘s method, Taylor‘s series method, Euler‘s method, Modified Euler‘s method, Runge-Kutta method of 4^{th} order.

UNIT III: Special functions & Multiple integrals:

Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Multiple Integrals: Double integrals in Cartesian & polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

UNIT IV: Vector Calculus:

Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div & Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Vector Integration: Line integral, Green‘s theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

UNIT V: Complex Variables:

Introduction, Complex function, Limit and continuity of a complex function, Derivative of f(z), Analytic functions, Harmonic functions & orthogonal system, Milne-Thomson method.

Applications: Applications to flow problems. **Complex Integration & Series Expansion:**

Complex integration, Cauchy‘s theorem and Cauchy‘s integral formula (without proofs), Series of complex terms, Taylor‘s series and Laurent‘s series (without proofs).

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
2. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

18EC1T03: APPLIED CHEMISTRY

Scheme and Credits: L:3 T:0

P:0 C:3 Prerequisites: -

Course Outcomes

CO1: Study of polymers and composite materials enable us to use them in a good number of engineering fields

CO2: Industries are run by the quality of fuels and energy crisis can be met by broad understanding of different fuels

CO3: Electrochemical principles form the basis of batteries that are being developed. Destruction of metals and alloys can be prevented by understanding the science of corrosion.

CO4: Study of the existing developed materials forms a basis for developing more number of advanced materials

CO5: Methods of purification of water can be known so that more of them can be developed

CO6: The importance of engineering materials in the domestic and engineering fields can be understood.

Syllabus:

UNIT I: POLYMERS AND PLASTICS

Introduction- Degree of polymerization-functionality-tacticity-Types- Addition polymerization-Definition- PVC-Properties-applications, condensation polymerization-Bakelite-Properties-applications Physical and mechanical properties – Conducting polymers– Biodegradable polymers-applications– Natural rubber- Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol -Thermoplastics and Thermosetting plastics –- Composite materials & Fiber reinforced plastics

UNIT II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes) Primary cells: Zinc – air cell,Secondary cells:- Lithium ion batteries, Pb-acid cell, *Fuel cells:*- H_2-O_2 fuel cell and molten carbonate fuel cells ***Corrosion:*** Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating - Electroless plating

UNIT III: NON CONVENTIONAL ENERGY SOURCES

Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance,

Non-conventional energy sources:

i. Hydropower include setup a hydropower plant (schematic diagram)

ii. Geothermal energy: Introduction-schematic diagram of a geothermal power plant
iii. Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level.
iv. Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation.
v. Biomass and biofuels

UNIT IV: SEMICONDUCTORS AND SUPER CONDUCTORS

Non –Elemental Semi conductors: Stoichiometric, Non- Stoichiometric ,Controlled valency & Chalcogen photo/semiconductors- Preparation of Semiconductors Ge & Si by crystal pulling technique – purification by Zone refining. Semiconductor Devices:- Diode –Transistor, **Super conductors:-**Definition-Types-Characteristics –applications

UNIT V: ADVANCED MATERIALS AND GREEN CHEMISTRY

Nano materials:-Introduction –General methods of preparation (top down and bottom up)

Liquid Crystals-Definition, classification, applications, ***Green synthesis:*** **-** Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources (microwave method) -R4M4 principles-Econoburette.

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

UV Spectroscopy- Basic principle-Instrumentation- Applications, IR Spectroscopy- Basic principle-Instrumentation- Applications, NMR Spectroscopy- Basic principle-Instrumentation- Applications, Analytical techniques: FE-SEM, TEM, BET, Chromatography techniques: Paper chromatography, Thin layer chromatography- applications

Standard Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM

18EC2T04: Biology for Engineers

Course Outcomes

After studying the course, the student will be able to:

CO 1: Understand how biological observations lead to major discoveries and the morphological, Biochemical and ecological classification of organisms.

CO 2: Understand that all forms of life have the same building blocks and their involvement in the Maintenance and metabolic processes of living organisms.

CO 3: Classify enzymes and distinguish between different mechanisms of enzyme action and Study the chemical reactions that are catalyzed by enzymes. Apply thermodynamic principles to biological systems and able to understand major chemical processes that occur within a living organism in order to maintain life.

CO 4: Identify DNA as a genetic material in the molecular basis of information transfer.

CO 5: Identify and classify microorganisms, understand media compositions and growth of Microorganisms

Unit I: Introduction

Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry. Classification of organisms based on (a) Cellularity- Unicellular or Multicellular, (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

Unit II: Biomolecules

Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function. Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

Unit III: Enzymes & Metabolism

Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters. Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

Unit IV: Information Transfer

Concept of genetic code. Molecular basis of information transfer; Transcription and translation.

Unit V: Microbiology

Concept of species and strains, Identification of Microorganisms. Sterilization and media compositions, Growth kinetics.

Text/Reference Books:

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C.Brown Publishers

18EC2T05: Basic Electronics and Electrical

Engineering Scheme and Credits: L:3 T:1 P:0 C:4

Prerequisites:

- Course

Outcomes

- To understand and analyze basic Electrical circuits
- To study the working principles of Electrical Machines
- .to understand the concepts of power generation and transmission
- To introduce components of Electrical Installations
- To understand various electrical safety measures
- To understand the concepts and applications of electronic devices

SYLLABUS

Unit – I: Diodes

PN junction diode- Energy band diagram of PN junction Diode- V-I Characteristics -Current components in PN junction Diode- Diode equation- Diode resistance and capacitance- Characteristics of Zener Diode- Varactor Diode- SCR and UJT.

Unit-II: Rectifiers & Wave Shaping:

Half wave, Full wave Rectifier and Bridge rectifier- Derivations of characteristics of rectifiers- Filters- Inductive and Capacitive filters- Non Linear Wave shaping Circuits.

Unit-III: Transistor Characteristics:

Bipolar Junction Transistor- Transistor current components- Transistor equation- Transistor configurations- Characteristics of a transistor in CB,CC & CE configurations- Transistor as a Switch- Transistor as an amplifier.

Transistor Biasing and stabilization

Introduction- Different Biasing Methods- Fixed bias, Collector to Base bias & voltage divider bias- Stabilization against variations in V_{BE}, I_C & β- Stabilization factors- Bias compensation, Thermal Runaway- Thermal Stability.

Unit-IV: Field Effect Transistors (FET):

Junction Field Effect Transistor construction & operation- characteristics CS, CD & CG- FET Biasing methods and stabilization- **MOSFET:** Metal Oxide Semiconductor Field Effect Transistor- Types- Construction- Operation & characteristics

Unit V: Electrical Devices

Transformers – Operation, working Principle and types – Motors – AC, DC, Servo & Synchros – Operations & Working Principle – Applications of Electrical Devices

Text Books:

1. 1.Electronic Devices & Circuits –J.Millman, C.Halkias, Tata Mc-graw Hill,2nd Edition
2. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGraw Hill, 2nd Edition
3. D. P. Kothari and I. J. Nagrath, ―Basic Electrical Engineering‖, Tata McGraw Hill, 2010.

Reference Books:

1. D. C**.** Kulshreshtha, ―Basic Electrical Engineering‖, McGraw Hill, 2009.
2. Basic Electronic Circuits -V.K.Mehta,S-chand Publications,2008.
3. Electronic Devices & Circuits-David-A-Bell,oxford University Press 5th Edition.

18EC2T06: DATA STRUCTURES USING C

Scheme and Credits: L:2 T:0 P:0 C:2

Prerequisites: Problem solving

using C Course Outcomes

The student will learn

- To implement linked list and its applications
- To implement stacks
- To implement queues.
- To implement trees.
- To implement graphs
- To sort arrays using different techniques

Syllabus:

UNIT I Linear Data Structures- List

Abstract Data Types (ADTs), List ADT, Array based implementation, linked list implementation, singly linked lists, circularly linked lists, doubly linked lists, applications of lists, Polynomial Manipulation

UNIT II

Linear Data Structures-Stacks

Stack ADT, Array Representation of Stacks, Operations, Linked Representation of Stacks, Evaluating arithmetic expressions, Conversion of Infix to postfix expression

Linear Data Structures- Queues

Queue ADT, Array Representation of Queues, Linked Representation of Queues, Circular Queue, applications of Queues.

UNIT III Non Linear Data Structures- Trees

Introduction, Types of Trees, Tree traversals- In order, Preorder, Post order and Level order , Binary Search Tree, Operations on Binary Search Tree ,Threaded binary trees, Heap, Applications of heap.

UNIT IV Non Linear Data Structures- Graphs

Part-A : Definition , Representation of Graph , Types of graphs, Graph Traversal Algorithms, Breadth first traversal, Depth first traversal , shortest Path Algorithms, Minimum Spanning Trees, Kruskal‘s Algorithm, Prim‘s Algorithm, Dijkstra‘s algorithm, Warshall‘s Algorithm, Applications of graphs.

UNIT V Sorting and Hashing

Bubble sort, Selection sort, Insertion sort, Shell sort, Radix sort, Merge sort, Quick sort, Heap Sort, Hashing and Hashing functions.

TEXT BOOKS:

1. Mark Allen Weiss, –Data Structures and Algorithm Analysis in C‖, 2nd Edition, Pearson Education.
2. Reema Thareja, –Data Structures Using C‖, Second Edition , Oxford University Press

REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, –Introduction to Algorithms‖, Second Edition, Mcgraw Hill.
2. Aho, Hopcroft and Ullman, –Data Structures and Algorithms‖, Pearson Education.
3. Stephen G. Kochan, –Programming in C‖, 3rd edition, Pearson Education.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson,Freed, –Fundamentals of Data Structures in C‖, Second Edition, University Press.

18EC2L07: Applied chemistry laboratory

Scheme and Credits: L:0 T:0 P:3 C:1.5

Prerequisites: -

List of Experiments

S. No	Name of the Experiment
1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na2CO3 and NaOH.
4	Determination of temporary and permanent hardness of water using standard EDTA solution.
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

18EC2L08: Basic Electronics & Electrical Engineering Lab

Scheme and Credits: L:0 T:0 P:4

C:2 Prerequisites: -

Note: The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

COURSE OBJECTIVES:

- To study basic electronic components
- To observe characteristics of electronic devices

COURSE OUTCOMES:

- At the end of the course the students can able to
- Measure voltage, frequency and phase of any waveform using CRO.
- Generate sine, square and triangular waveforms with required frequency and amplitude using function generator.
- Analyze the characteristics of different electronic devices such as diodes, transistors etc., and simple circuits like rectifiers, amplifiers etc.,

Electronic Workshop Practice:

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

List of Experiments: (All Experiments has to be performed)

1. CRO Operation and its Measurements
2. **Characteristics of Semiconductor Diode and Zener Diode:** Determination of forward and reverse resistance from VI characteristics.

3. **Static Characteristics of BJT under CE Mode:** Transistor Biasing **Determination** of h-parameters hie, hre from input characteristics and hfe & hoe from output characteristics.
4. **Static Characteristics of JFET:** Determination of rd from drain characteristics and gm from mutual characteristics and hence obtain μ.
5. **Characteristics of UJT and SCR:** Determination of intrinsic standoff ratio from emitter characteristics.
6. **Resonant Circuits:** Characteristics of Series and Parallel Circuits, Determination of quality factor and bandwidth.
7. **Bridge Rectifier with and without C-Filter:** Display of output waveforms and Determination of ripple factor, efficiency and regulation for different values of load current.
8. **Diode Clipping Circuits:** Design and display the transfer characteristics of single ended series, shunt type and double ended shunt type clipping circuits.
9. **Study of Electrical Devices**
10. **Experiment on working principle of Transformers**
11. **Experiment on working Principle of Motors**

18EC2L09: Data Structures Using C Lab

Scheme and Credits: L:0 T:0 P:3

C:1.5 Prerequisites: C

Programming

List of Experiments:

1. Write a program for performing operations on Single linked list
2. Write a program for performing operations on double linked list
3. Write a program for performing adding two polynomials
4. Write a program for implementing stacks using arrays
5. Write a program for implementing stacks using linked list
6. Write a program for implementing queues using arrays and linked list
7. Write a program for converting an infix expression to postfix expression
8. Write a program for binary tree traversals
9. Write a program for implementing operations on BST
10. Write a program for graph traversal algorithms
11. Write a program for implementing prims algorithm
12. Write a program for implementing kruskals algorithm
13. Write a program for implementing

a. Merge sort

b. Heap sort

c. Quick sort

SEMESTER-III

SYLLABUS

III SEMESTER	L	T	P	C
	3	1	0	4

18EC3T01-PROBABILITY THEORY AND STOCHASTIC PROCESSES

Course Objectives:

- To give students an introduction to elementary probability theory, in preparation for courses on statistical analysis, random variables.
- To mathematically model the random phenomena with the help of probability density concepts.
- To perform the operations on random variables.
- To analyze the concepts on random process and noise sources.
- To characterize spectral distribution and linear system with random inputs.

Course Outcomes:

- Upon completion of the subject, students will be able to compute:
- Define sample space and probability
- Understand the concept of random variable ,distribution and density functions
- Operations on Single and Multiple Random Variables
- Evaluate the temporal characteristics of random process
- Analyze the spectral characteristics and response of linear system for random input.

Syllabus

UNIT-I:

Probability and Random Variable:

Overview of Probability Theory: Sets, sample space and events, Axioms of Probability, Baye‘s Rule and Applications. Random Variables: Types, Distribution and Density of Random Variables and Properties, Conditional distribution and densities, Properties.

UNIT -II:

Distribution & Density Functions

Distribution and Density function of sum of two Independent Random variables. Some Special Random variables: Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Transformation of random variables.

UNIT-III:

Operations on Single and Multiple Random Variables

Moments of Random Variable, Joint Moments, Marginal distribution and density functions. Characteristic Function, Moment Generating Function, central limit theorem.

UNIT-IV:

Random Processes

Concept and classification of Random Process, Concept of Stationary Random Process, Wide Sense Stationary, Time Averages, Ergodicity, Auto Correlation, Cross Correlation, Covariance and properties, Modeling of Noise Sources, Effective Noise Temperature and Noise Figure.

UNIT-V:

Spectral Characteristics of Random Process

Power Spectrum-Properties, Relation between PSD and Autocorrelation function of a Random Process, Cross spectral Density and its relation with Cross Correlation function, Linear Systems with Random Inputs, System Responses and Statistics.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4Ed. 2001.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PMI, 4 Ed., 2002.

REFERENCE BOOKS:

1. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, 3 Ed., PE 2002
2. Probability Methods of Signal and System Analysis - George R. Cooper, Clave D. MC Gillem, 3 Ed., 1999, Oxford.

III SEMESTER	L	T	P	C
	3	0	0	3

18EC3T02-ELECTRONIC CIRCUIT ANALYSIS

Objectives:

The main objectives of this course are:

- Small signal low and high frequency BJT transistor amplifier models and the expressions for the respective parameters are derived.
- Cascading of single stage amplifiers is discussed. Expressions for overall voltage gain are derived.
- The concept of feedback is introduced. Effect of negative feedback on amplifier characteristics is explained and necessary equations are derived.
- Basic principle of oscillator circuits is explained and different oscillator circuits are given with their analysis.
- Power amplifiers Class A, Class B, Class C, Class AB and other types of amplifiers are analyzed.

Outcomes:

At the end of this course the student can able to:

- Design and analyze the small signal low and high frequency transistor amplifier using BJT
- Design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT
- Identify and analyze the different feedback topologies.
- Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
- Know the classification of the power amplifiers and their analysis with performance comparison.

Syllabus:

UNIT-I

Small Signal Transistor Amplifier models:

Low Frequency Transistor Amplifier Models: Two port network, Transistor hybrid model, determination of h-parameters, generalized analysis of transistor amplifier model using h-parameters

High Frequency Transistor Amplifier models: Transistor at high frequencies, Hybrid- π common emitter transistor model, Hybrid π conductances, Hybrid π capacitances, CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product.

UNIT-II

Multistage Amplifiers : Classification of amplifiers, methods of coupling, cascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Cascode amplifier, Boot-strap emitter follower, Analysis of multi stage amplifiers using FET, Differential amplifier using BJT.

UNIT -III

Feedback Amplifiers : Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Method of analysis of feedback amplifiers.

UNIT-IV

Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and Wein bridge oscillators with BJT and FET and their analysis, Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators with BJT and FET and their analysis, Frequency and amplitude stability of oscillators.

UNIT-V

Power Amplifiers: Classification of amplifiers, Class A power Amplifiers and their analysis, Harmonic Distortions,Class B Push-pull amplifiers and their analysis, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C power amplifier, Thermal stability and Heat sinks, Distortion in amplifiers.

Text Books:

1. Integrated Electronics- J. Millman and C.C. Halkias, Tata Mc Graw-Hill, 2009.
2. Electronic Devices and Circuits- Salivahanan, N.Suressh Kumar, A. Vallavaraj, TATA McGraw Hill, Second Edition

References:

1. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc Graw Hill.
2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.

III SEMESTER	L	T	P	C
	3	0	0	3

18EC3T03-DIGITAL ELECTRONICS

Course Objectives:

The primary objective of this course is:

- To represent numbers and conversion between different representations.
- To analyze logic processes and implement logical operations.
- To develop the combinational logic circuits.
- To design and analyze the concepts of sequential circuits.
- To understand concept of programmable logic devices like PROM, PLA, PAL.

Course Outcomes

Upon completion of the course student will be able to:

- Understand different number systems and their conversions.
- Analyze the logical operations and Boolean algebra
- Develop combinational circuits and perform logical operations.
- Design the sequential logic functions.
- Know finite state machines and different programmable logic devices.

Syllabus:

UNIT I

Number Systems:

Binary- Octal- Decimal- Hexadecimal Number Systems- Conversion of Numbers from One Radix to Another Radix- r's Complement- (r-1)'s Complement- Subtraction of Unsigned Numbers- Problems- Signed Binary Numbers- Weighted and Non weighted codes.

UNIT II

Logic Gates and Boolean Algebra:

Basic Gates- Universal Gates- Ex-Or and Ex-Nor Gates- SOP- POS- Boolean Theorems- Dual of Logical Expressions- Minimizations of Logic Functions Using Boolean Theorems- K Map Method- Minimization of Boolean Functions.

UNIT III

Combinational Logic Circuits:

Design of Half Adder- Full Adder- Half Subtractor- Full Subtractor- Ripple Adder, Carry Look Ahead adder and Subtractors- Design of Decoders- Encoders- Multiplexers- Demultiplexers- Priority Encoder- Code Converters- Magnitude Comparator. Cascading of Decoders & Multiplexers

Introduction to Programmable Logic Devices (PLDs):
PLA- PAL- PROM- Realization of Switching Functions Using PROM- Comparison of PLA, PAL and PROM.

UNIT IV
Introduction to Sequential Logic Circuits:
Basic Sequential Logic Circuits- Latch and Flip-Flop- RS- Latch Using NAND and NOR Gates- RS, JK, T and D Flip Flops- Conversion of Flip Flops- Flip Flops With Asynchronous Inputs (Preset and Clear).
Registers and Counters:
Design of Registers- Control Buffer Registers- Bidirectional Shift Registers- Universal Shift Register- Design of Ripple Counters- Synchronous Counters and Variable Modulus Counters- Ring Counter- Johnson Counter .

UNIT V
Finite state machine:
Analysis of clocked sequential circuits- state diagrams- state tables- design procedures- Realization of circuits using various flip-flops- ASM- Meelay to Moore conversion and vice-versa.

TEXT BOOKS
1. Digital Design , M.Morris Mano, Michael D Ciletti, 4th Edition,PEA,2003
2. Fundamentals of Logic Design, Roth, 5th Edition,Cengage 2004

REFERENCE BOOKS
1. Switching and Finite Automata Theory,Kohavi, 3rd Edition, Jha, Cambridge 2005
2. Digital Logic Design, Leach, Malvino, Saha, TMH,2000

III SEMESTER	L	T	P	C
	3	0	0	3

18EC3T04-NETWORK THEORY

COURSE OBJECTIVES:

The primary objective of this course is:

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states in RLC circuits.
- To know the basic Laplace transforms techniques in periods‘ waveforms.
- To understand the two port network parameters.
- To understand the properties of LC networks and filters.

COUSE OUTCOMES:

Upon completion of the course student will be able to:

- Gain the knowledge on basic network elements and graph theory.
- Understand Network Theorems and applications
- Analyze Coupled circuits and Resonance.
- Will analyze the RLC circuit‘s behavior in detailed.
- Gain the knowledge in characteristics of two port network parameters

Syllabus:

UNIT – I

Introduction to Electrical Circuits: Network Elements- Sources- Sources Conversions- Kirchhoff‘s laws- RMS value, Average value, Form factor and peak factor- Phasor representation. **Graph Theory:** Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, basic tie set schedule, basic cut set schedule.

UNIT – II

Network Theorems: Thevinin‘s, Norton‘s, Milliman‘s, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens and Duality.

UNIT – III

Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, Natural current, conductively coupled equivalent circuits- **Resonance:** Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, current in anti resonance, anti resonance at all frequencies.

UNIT – IV

Time and Frequency Domain Analysis of Electrical Circuits : Time domain analysis of R-L R-C and RL-C circuits, initial and final conditions of Network elements, steady state and transient response, Analysis of electrical circuits using Laplace Transform, steady state analysis using phasors, solutions of network equations using Laplace Transform, frequency domain analysis of RL-C circuit.

UNIT – V

Two-port networks : Relationship of two port networks, Z-parameters, Yparameters Transmission line parameters, h-parameters, Inverse h parameters, Inverse Transmission line parameters, Relationship between parameter sets, Parallel connection of two port networks, Cascading of two port networks, series connection of two port networks.

TEXT BOOKS:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Network Analysis by K.Satya Prasad and S Sivanagaraju, Cengage Learning,2nd Edition,2005

REFERENCES:

1. Network lines and Fields by John. D. Ryder 2nd edition, Asia publishing house.2002
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers.

III SEMESTER	L	T	P	C
	3	0	0	3

18EC3T05-SIGNALS & SYSTEMS

COURSE OBJECTIVES:

The main objectives of this course are given below:

- To introduce the terminology of signals and systems.
- To introduce Fourier tools through the analogy between vectors and signals.
- To introduce the concept of sampling and reconstruction of signals.
- To analyze the linear systems in time and frequency domains.
- To study z-transform as mathematical tool to analyze discrete-time signals and systems.

COURSE OUTCOMES:

At the end of this course the student will able to:

- Characterize the signals and systems and principles of vector spaces, Concept of Orthogonality.
- Analyze the Fourier series, Fourier transform and Laplace transform.
- Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- Understand the relationships among the various representations of LTI systems
- Apply z-transform to analyze discrete-time signals and systems.

Syllabus:

UNIT- I

INTRODUCTION: Definition of Signals and Systems, Elementary signals, Operations on signals, classification and characteristics of Signals, Analogy between vectors and signals, and Orthogonality concepts.

FOURIER SERIES: Fourier series representation of continuous time periodic signals, properties of Fourier series.

UNIT –II

FOURIER TRANSFORM: Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms and Hilbert Transform.

LAPLACE TRANSFORMS: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept ROC for Laplace transforms, constraints on ROC Properties of L.T‘s, Relation between L.T‘s, and F.T. of a signal.

UNIT-III

ANALYSIS OF LINEAR SYSTEMS: Linear system, impulse response, Response of a linear system, Concept of convolution in time domain and frequency domain, Transfer function of a LTI system, Distortion less transmission through a system, Ideal LPF, HPF and BPF characteristics, Causality and Poly- Wiener criterion for physical realization

UNIT –IV

SAMPLING THEOREM – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing and Band Pass sampling.

UNIT–V

Z–TRANSFORMS: Difference between continuous-time and discrete-time, Concept of Z- Transform of sequence. Distinction between Laplace, Fourier and Z transforms. ROC in Z-Transform, constraints on ROC, Inverse Z-transform and properties of Z-transforms.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.2002

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.2002
2. Principles of Linear Systems and Signals – BP Lathi, Oxford University Press, 2015

III- SEMESTER	L	T	P	C
	3	0	0	3

18EC3T06-MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

The main objectives of this course are given below:

- To understand the concept of Managerial Economic s and Demand forecasting
- To analyze the concept of Production function, Input Output relationship and different Cost Concepts.
- To know the different forms of Business organization and their Merits and Demerits
- To evaluate the different Accounting Systems preparation of Financial Statements for performance.
- To know Essence of Capitalization, Capital Budgeting and using different methods.

COURSE OUTCOMES:

At the end of this course the student will able to:

- The estimate the Demand for a product and the relationship between Price and Demand.
- Analyze the Cost Concepts and to estimate the least cost combination of inputs.
- One should equipped with the knowledge of different Business Units
- To prepare Financial Statements and the usage of various Accounting tools.
- The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

Syllabus

UNIT – I:

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects- Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Demand forecasting and its Methods.

UNIT – II:

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions- Cobb-Douglas Production function-Economics of Sale-Cost Concepts- Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs

Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis- Determination of Break-Even Point (Simple Problem).

UNIT – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements- Analysis and Interpretation of Financial Statements

Capital Budgeting: Meaning of Capital Budgeting-Need for Capital Budgeting- Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS:

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: _Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.
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REFERENCES:

1. Suma Damodaran : Managerial Economics, Oxford 2011.
2. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.

III SEMESTER	L	T	P	C
	0	0	3	1.5

18EC3L07-ELECTRONIC CIRCUIT ANALYSIS LAB

COURSE OUTCOMES:

At the end of this course the student can able to:

- Understand how the amplification under small signal models.
- Analyzing frequency response of amplifiers.
- Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
- Utilize the Concepts of negative feedback to improve and importance of multivibrators.
- Understand the concepts of sampling gates.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Evaluation of h-parameters of BJT
2. Darlington Amplifier
3. Power Amplifiers Analysis & Efficiency
4. RC Coupled Single-stage BJT Amplifier: Determination of lower and upper cutoff frequencies, mid band voltage gain, gain bandwidth product from the frequency response and Determination of input and output impedances at mid frequency range.
5. Emitter Follower: Determination of mid band voltage gain, input and output impedances at mid frequency range.
6. Class-B Complementary Symmetry Power Amplifier: Display of input and output waveforms and Determination of the conversion efficiency and optimum load.
7. 7 voltage series and current shunt feedback amplifiers
8. BJT Colpitt‘s Oscillator: Design and test the performance for a given frequency.
9. BJT RC Phase Shift Oscillator: Design and test the performance for a given frequency
10. Design of Bistable Multivibrator
11. Design of Monostable Multivibrator
12. Design of Astable Multivibrator

ELECTRONIC CIRCUIT ANALYSIS LAB

Equipment required:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

III- SEMESTER	L	T	P	C
	0	0	3	1.5

18EC3L08-SIGNALS AND SYSTEMS LAB

COURSE OUTCOMES:

After studying this course the students would gain enough knowledge

- Have a thorough understanding of the fundamental concepts and techniques used
- To understand and examine the signals and its operations.
- The ability to understand and analyze sampling process.
- Ability to identify basic requirements for a transformation techniques in continuous and discrete time

LIST OF EXPERIMENTS

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3. Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal/ sequence and real and imaginary parts of signal.
5. Convolution between signals and sequences.
6. Autocorrelation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a given continuous/discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace Transform.
12. Locating the zeros and poles and plotting the pole-zero maps in S plane and Z-plane for the given transfer function.
13. Generation of Gaussian noise (real and complex), computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling theorem verification.
15. Removal of noise by autocorrelation / cross correlation.
16. Extraction of periodic signal masked by noise using correlation.
17. Verification of Winer-Khinchine relations.

18. Checking a random process for stationarity in wide sense.

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Equipment & Software required:

Software:

i. Computer Systems with latest specifications
ii. Connected in Lan (Optional)
iii. Operating system (Windows XP)
iv. Simulations software (Simulink & MATLAB signal Processing Toolbox)

III SEMESTER	L	T	P	C
	2	0	0	0

18EC3T09-Constitution of India

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative.

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government i.e, Executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

UNIT-I

Introduction to Indian Constitution: Constitution‘ meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

LEARNING OUTCOMES:

After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History, features of Indian constitution
- Evaluate Preamble Fundamental Rights and Duties

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organization, Structure and Functions

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the structure of state government
- Analyze the role Governor and Chief Minister
- Explain the role of state Secretariat
- Differentiate between structure and functions of state secretariat

UNIT-IV

Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zilla Panchayat, Elected officials and their roles, CEO Zilla Panchayat: Block level Organizational Hierarchy-(Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration role and importance
- Analyze the role of Myer and elected representatives of Municipalities
- Evaluate Zilla panchayat block level organisation

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission: Functions of Commissions for the welfare of SC/ST/OBC and women

LEARNING OUTCOMES: - After completion of this unit student will

- Know the role of Election Commission apply knowledge
- Contrast and compare the role of Chief Election commissioner and Commissiononerate
- Analyze role of state election commission
- Evaluate various commissions of viz SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/101104065/
2. www.hss.iitb.ac.in/en/lecture-details
3. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

SEMESTER-IV

SYLLABUS

IV SEMESTER	L	T	P	C
	3	0	0	3

18EC4T02-Humanities-1 (Effective Technical Communication)

UNIT I Vocabulary Building

The concept of word formation
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
Synonyms, antonyms and standard abbreviations

UNIT II Writing Skills

Sentence structures
Use of phrases and clauses in sentences
Importance of proper punctuation
Creating coherence
Organizing principles of paragraphs in documents
Comprehension
Essay writing

UNIT III Identifying Common Errors in Writing

Subject-verb agreement
Noun-Pronoun agreement
Misplaced Modifiers
Articles
Prepositions
Redundancies
Clichés

UNIT IV Oral Communication

Common Everyday situations: Conversations and Dialogues
Communication at workplace
Interviews
Formal Presentations

UNIT V Life Skills

Self-assessment and self esteem
Attitudes, values and beliefs
Personal goal setting
Career planning
Managing Time
Complex Problem solving
Creativity

Suggested Readings:

1. Practical English usage, Michael Swan, OUP 1995
2. Remedial English Grammar, F.T.Wood.Macmillan, 2007
3. On writing well. William Zinsser, Harper Resource book, 2001
4. Study Writing, Liz-Hamp-Lyons and Ben Heasly, Cambridge University Press, 2006
5. Communication Skills, Sanjay Kumar and Pushp Latha, Oxford University press, 2011
6. Exercises in spoken English parts I-III, CIEFL, Hyderabad Oxford university press

IV SEMESTER	L	T	P	C
	2	0	0	2

18EC4T02-Physics of Materials

UNIT I

CRYSTAL STRUCTURES :

Crystalline & Non-crystalline states; Geometry of crystals-Space Lattices; Bravais Lattice-SC, BCC & FCC lattices; Crystal Structure, Directions & Planes; Miller Indices; Structure determination by X-ray diffraction; Bragg's law.

UNIT II

CRYSTAL IMPERFECTIONS :

Crystal Imperfections-Point imperfections; Enthalpy; Gibbs Free Energy; Geometry of Dislocation; Other Properties of Dislocation; Surface Imperfections.

UNIT III

CONDUCTIVITY OF MATERIALS:

Conductivity of Metals; Introduction; Resistivity and Factors Affecting Resistivity of conducting materials; The Electron Gas Model of Metal; Motion of Electron in Electric Field; Equation of Motion of An Electron; Current Carried by Electron; Mobility; Energy Levels of a Molecule; Fermi Energy; Fermi Dirac Distribution; Contact Potential; Effect of Temperature on Electrical Conductivity of Metals.

UNIT IV

ULTRASONICS

Intoduction-Properties- Production – Ultrasonic transducers – Non Destructive Testing (NDT) – Pulse Echo Technique - Applications.

UNIT V

PHYSICAL OPTICS

INTERFERENCE: Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton's rings- Determination of wavelength of light.
DIFFRACTION: Fraunhofer diffraction at single slit- double slit (Qualitative treatment only), N-slits – Diffraction Grating.

Text Books:

1. Materials Science and Engineering – A First Course by V. Raghavan, Fifth Edition, Thirty-ninth Print, June 2010 Edition, Prentice-Hall Of India Pvt Ltd.
2. II. Introduction to Electrical Engineering Materials, C.S. Indulkar and S. Thiruvengadam, 6th Edition, Reprint 2012, S. Chand and Company Ltd.

Reference Books:

1. Electronic Engineering Materials and Devices, John Allison, Tata McGraw Hill, New Delhi. 2000
2. Elements of Materials Science and Engineering, Lawrence H. Van Vlack, Pearson Education 6th Edition 2004

IV SEMESTER	L	T	P	C
	3	0	0	3

18EC4T03-ANALOG IC APPLICATIONS

Course Objectives:

The student will be made

- To learn the working of logic families
- To understand the functioning of different types of Time-base Generators.
- To understand the analysis & design of different types of active filters using op-amps
- To learn the internal structure, operation and applications of different analog ICs
- To Acquire Knowledge of A/D and D/A Converter

Course Outcomes

After going through this course the student will be able to

1. Understand about Logic Families with Diode-Transistor
2. Design different Time base generators.
3. Design circuits using operational Amplifier for various applications
4. Understand the concept of A/D & D/A Converters
5. Analyze and design amplifiers and active filters using Op-amp.

Syllabus:

.UNIT I

LOGIC FAMILIES Diode Logic, Transistor Logic, Diode-Transistor Logic, Transistor-Transistor Logic, Emitter Coupled Logic, AOI Logic and Comparison of Logic Families.

UNIT II

TIME BASE GENERATORS:

General features of a time base signal, Methods of generating time base waveform- Exponential Sweep Circuits, Negative Resistance Switches, Miller and Bootstrap time base generators.

UNIT III

OPERATIONAL AMPLIFIER

Classification; IC Chip Size and Circuit Complexity; the Ideal Operational Amplifier; Operational Amplifier Internal Circuit. Op-Amp parameters & Measurement, DC Characteristics; AC Characteristics and Compensation Techniques.

UNIT-IV

OPERATIONAL AMPLIFIER APPLICATIONS

Basic Op-Amp Applications; Inverting and Non-inverting amplifier, input & output off set voltages & currents, slew rate, CMRR, PSRR, drift. Integrator and differentiator, Difference amplifier, Instrumentation Amplifier; AC Amplifier; V to I and I to V Converters. Op-Amp Circuits using Diodes; Sample and Hold Circuit; Operational transconductance Amplifier (OTA). Comparator; Regenerative Comparator.

D-A AND A-D CONVERTERS

Introduction; Series Op-Amp Regulator; Basic DAC Techniques Weighted Resistor DAC,R-2R DAC ; A-D Converters, Flash ADC and Successive approximation Converter.

UNIT V

FILTERS USING OP-AMP & 555 TIMERS

Analysis of Butterworth active filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and all pass filters Description of Functional Diagram of 555 Timer; Monostable Operation; Astable Operation and its Applications and PLL, Applications PLL. VCO and its applications.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill,4th Edition,2005
2. Linear Integrated Circuits – D. Roy Choudhury, New Age International (p) Ltd, 2nd Edition,2003.

REFERENCES:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill,Second Edition, 2007.
2. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.

IV SEMESTER	L	T	P	C
	3	0	0	3

18EC4T04-DIGITAL SYSTEM DESIGN USING HDL

COURSE OBJECTIVES:

The student will be introduced to

- In this course, students can study Integrated circuits for all digital operational designs like adder, subtractor, multipliers, multiplexers, registers, counters, flip flops, encoders, decoders and memory elements like RAM and ROM.
- Design and to develop the internal circuits for different digital operations and simulate them using hardware languages using integrated circuits.
- Understand the concepts of Latches and Flip-Flops and Design of Counters using Digital ICs, modeling of sequential logic integrated circuits using VHDL.

COURSE OUTCOMES:

After going through this course the student will be able to

1. Understand the concepts of Design Flow and Programming Statements
2. Understand the concepts of Combinational logic circuits in digital system
3. Understand the concepts of sequential logic circuits in digital system
4. Understand the concepts of Programmable logic devices & memories.
5. Understand the concepts of HDL modeling and logic families

Syllabus

UNIT-I

Digital Design Using HDL: Design flow, program structure, VHDL requirements, Levels of Abstraction, Elements of VHDL, Concurrent and Sequential Statements, Packages, Libraries and Bindings, Objects and Classes, Subprograms, Comparison of VHDL and Verilog HDL.

UNIT-II

Combinational Logic Design: Adders & Subtractors, ALU, Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, parity circuits, comparators, multipliers, Barrel Shifter, Simple Floating-Point Encoder, Dual Priority Encoder.

UNIT-III

Sequential Logic Design: Flip-Flops, Counters, Ring Counter, Johnson Counter, Modulus N Synchronous Counters, Shift Registers, Modes of Operation of Shift Registers, Universal Shift Register. Linear feedback shift register and applications.

UNIT-IV

Programmable Logic Devices (PLDs) & Memories: PROM, PLA, PALD, ROM: Internal structure, 2D-Decoding, timing and applications, Static RAM and Dynamic RAM: Internal structure, timing, standard, synchronous.

UNIT-V

VHDL Modelling and Digital Logic Families: Simulation, Logic Synthesis, Technology Libraries, Functional Gate-Level verification, Place and Route, Post Layout Timing Simulation, Static Timing, Major Netlist formats for design representation, VHDL Synthesis-Programming Approach. Introduction to logic families, CMOS logic, CMOS steady state and dynamic electrical behavior, CMOS logic families.

TEXT BOOKS:

1. Digital Design Principles & Practices – John F.Wakerly, PHI/ Pearson Education Asia, 3rd Edition, 2005.
2. VHDL Primer – J. Bhasker, Pearson Education/ PHI, 3rd Edition, 2004

REFERENCES:

1. "Fundamentals of Digital logic design with VHDL". Stephen Brown & Zvonko Vranesic, Tata McGraw Hill, 2nd edition.2004
2. Designing with TTL Integrated Circuits: Robert L. / John R. Morris & Miller.

IV SEMESTER	L	T	P	C
	3	0	0	3

18EC4T05-ELECTRO MAGNETIC WAVES AND TRANSMISSION LINES

COURSE OBJECTIVES:

The students will be introduced to

- Vector algebra coordinate systems
- Electrostatics and magnetostatics principles.
- Maxwell Equations in time varying fields.
- Electromagnetic wave and propagation characteristics.
- Transmission lines characteristics and different loading concepts.

COURSE OUTCOMES:

Up on completion of this course students will be able to

1. Know the basic principles of electrostatics
2. Understand the primary laws in magneto statics and its importance
3. Gain knowledge on functionalities of time varying fields
4. Determine the parameters in EM Wave propagating conditions
5. Derive and determine the conditions and constants in transmission lines

Syllabus:

UNIT I

Electrostatics: Coulomb‘s Law, Gauss Law and Applications, Electric Potential, Maxwell‘s Two Equations for Electrostatic Fields, Energy Density, Dielectric Constant, Continuity Equation, Relaxation Time, Poisson‘s and Laplace‘s Equations; Capacitances.

UNIT-II

Magneto Statics : Biot-Savart Law, Ampere‘s Circuital Law and Applications, Magnetic Flux Density, Maxwell‘s Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere‘s Force Law, Inductances

UNIT III

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms, Boundary Conditions.

UNIT IV

EM Wave Characteristics: Wave Equations, Uniform Plane Waves – Relations between E & H. Wave Propagation in Lossless and Conducting Media, Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, Brewster Angle, Critical Angle and Poynting Theorem.

UNIT V

Transmission Lines -: Transmission Line Equations, Primary & Secondary Constants, Phase and Group Velocities, Condition for Distortion less and Minimum Attenuation, Loading - Types of Loading. Reflection Coefficient, VSWR. λ/4, λ /2, λ/8 Lines Smith Chart, Stub Matching.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES:

1.Electromagnetic Fields and Wave Theory –GSN Raju, Pearson Education 2006
2.Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.

IV-SEMESTER	L	T	P	C
	3	0	0	3

18EC4T06-CONTROL SYSTEMS

COURSE OBJECTIVES

The student will

- Learn the fundamental concepts of Control systems and mathematical modelling of the system.
- Study the concepts of time response and frequency response of the system.
- Understand the basics of stability analysis of the system.
- Learn Design Principles of Different Controllers
- Know the Concept of State Variable Models

COURSE OUTCOMES

After going through this course the student will be able to

1. Represent the mathematical model of a system.
2. Determine the response of different order systems for various inputs in time domains
3. Analyze the stability of the system using RH and RL
4. Know the Frequency Response Using Different Graphical Networks
5. Design Controllers for Different Applications.

Syllabus:

UNIT I

INTRODUCTION: Concepts of Control Systems- Open Loop and closed loop control systems and examples, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

UNIT II

TRANSFER FUNCTION REPRESENTATION: Transfer Function of DC Servo motor - AC Servo motor-, Block diagram representation of systems -Block diagram algebra – Representation by Signal flow graph - Reduction using mason‘s gain formula. Conversion from Block diagram to signal flow graph & vice versa

UNIT III

TIME RESPONSE ANALYSIS: Time response of first order systems and second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative and proportional integral systems.

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability – Routh's stability criterion The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT IV

FREQUENCY RESPONSE ANALYSIS: Frequency domain specifications-Bode diagrams-Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Plots and Stability Analysis **UNIT V**

CLASSICAL CONTROL DESIGN TECHNIQUES: Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers. Concepts of state, state variables and state model, derivation of state models from block diagrams, State Transition Matrix and its Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Automatic Control Systems– by B. C. Kuo– John wiley and son's. 8th edition, 2003.
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.2002

REFERENCE BOOKS:

1. Modern Control Engineering – Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd.,3rd ed,.2000
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers

IV SEMESTER	L	T	P	C
	0	0	3	1.5

18EC4L07- ANALOG IC APPLICATIONS LAB.

Course Outcomes

After going through this course the student will be able to

- Understand about Logic Families with Diode-Transistor
- Design different Time base generators.
- Design circuits using operational Amplifier for various applications
- Analyze and design amplifiers and active filters using Op-amp.
- Understand the concept of A/D & D/A Converters

Minimum Twelve Experiments to be conducted:
The Following List of Experiments Will be performed

1. Study of Logic families using Diodes and Transistors.
2. Bootstrap sweep circuit.
3. Active Filter Applications – LPF, HPF (first order)
4. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
5. Study of Basic Op-Amp Circuits: Design and verification of inverting amplifier, non-inverting amplifier, voltage follower, integrator, differentiator and inverting adder circuits.
6. Op-Amp Schmitt Trigger: Design, testing, and display of waveforms.
7. Op-Amp RC Phase-Shift Oscillator: Design and test the performance for the given frequency.
8. Op-Amp Wein Bridge Oscillator: Design and test the performance for the given frequency.
9. Study of 555 Timer: Design and test the performance of Monostable multivibrator circuit for a given pulse width.
10. Study of 555 Timer: Design and test the performance of Astable multivibrator circuit for a given frequency.
11. Study of Voltage Regulator: Design and study of IC7805 voltage regulator, calculation of line and load regulation.
12. A/D Converter

Equipment required for Laboratory:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters
6. IC Trainer Kits (Optional)
7. Bread Boards
8. Components: - IC741, IC555, IC565, IC1496, IC723, 7805, 7809, 7912 and other essential components.
9. Analog IC Tester

IV-SEMESTER	L	T	P	C
	0	0	3	1.5

18EC4L08-DIGITAL SYSTEMS DESIGN USING HDL LAB

The students are required to design and draw the internal structure of the following Digital Integrated Circuits and to develop VHDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer. Further, it is required to verify the logic with necessary hardware.

COURSE OUTCOMES:

After going through this course the student will be able to

- Understand the concepts of Design Flow and Programming Statements
- Understand the concepts of Combinational logic circuits in digital system
- Understand the concepts of sequential logic circuits in digital system
- Understand the concepts of Programmable logic devices & memories.
- Understand the concepts of HDL modeling and logic families

List of Experiments:

1. Realization of Logic Gates
2. 3 to 8 Decoder
3. 8*1 Multiplexer and 2*1 De-multiplexer
4. 4-Bit Comparator.
5. D Flip-Flop
6. Decade Counter
7. 4 Bit Counter
8. Shift Register
9. Universal shift register
10. Ram (16*4) (read and write operations)
11. ALU

Equipment Required:

1. Xilinix ISE software-latest version
2. Personal computer with necessary pheripherals
3. Hardware kits- Various FPGA families.

IV SEMESTER	L	T	P	C
	0	0	4	2

18EC4L09-MINI PROJECT

The students are required to design and develop prototype model relevant to the Electronics and Communication. The prototype should be done by individual student. The model should be innovative in development; student should give presentation and demonstration of project work. The students are required to submit document of project report at the end.

COURSE OUTCOMES:

After going through this course the student will be able to

- Understand the real world problems
- Gain knowledge to solve and address the problem
- Improve presentation skills and writing skills
- Involve in both theoretical and practical work

The evaluation of mini project is done based on

1)Relevance of the project
2)Complexity of project work
3)New idea involved in the project
4)Current age Acceptance of the Project
5)Design and Development of project work
6)Presentation and Communication skill of student
7)Project Report given by the Student

SEMESTER-V

SYLLABUS

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T01 - Analog and Digital Communication

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Distinguish the figure of merits of various analog modulation methods
4. Familiarize with the fundamentals of digital communication systems
5. Familiarize with various techniques for digital modulation and demodulation of signals

Course Outcomes: After undergoing the course, students will be able to
1. Differentiate various Analog modulation schemes
2. Analyze demodulation schemes and their spectral characteristics
3. Analyze noise characteristics of various analog modulation methods
4. Differentiate various Digital modulation schemes
5. Analyze demodulation schemes and their spectral characteristics

UNIT I: AMPLITUDE MODULATION
Introduction to communication system, need for modulation, , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Detection of AM Waves;, Envelope detector, SNR Calculations of AM waves.

UNIT II: DSB & SSB MODULATION
DSB SC (Double side band suppressed carrier) modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Coherent detection of DSB-SC Modulated waves, SNR Calculations of DSB SC.

SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves. SNR of SSB.

UNIT III: ANGLE MODULATION
Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, zero crossing detector, Phase locked loop, SNR Caluculations.

UNIT IV: PULSE DIGITAL MODULATION
Elements of digital communication systems, advantages of digital communication systems, Elements of PCM, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM). Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT V: DIGITAL MODULATION TECHNIQUES
Introduction, ASK, FSK, PSK, DPSK, QPSK Transmitter and receivers Probability of error calculations.

TEXT BOOKS:

1. Principles of Communication Systems – H Taub& D. Schilling, GautamSahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES:

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T02- MICROPROCESSOR AND MICROCONTROLLER

COURSE OBJECTIVES:

1. To understand the basics of 8085 & 8086 microprocessors architectures and its functionalities.
2. To develop machine language programming in microprocessors.
3. To design and develop Microprocessor based interfacing for real time applications using low level language like ALP.
4. To understand the basics of microcontrollers architectures and its functionalities.
5. To design and develop microcontroller based interfacing for real time applications using low level language like ALP.

Course Outcomes:

1. To be able to understand the overview of 8085 & 8086 microprocessor in general.
2. To be able to understand the Assembly Language Programming in microprocessors.
3. To be able to understand Interfacing I/O devices through PPI with microprocessor.
4. To be able to understand the overview of microcontroller in general & ALP in microcontrollers.
5. To be able to understand the microcontroller interfacing with I/O devices using ALP.

UNIT-I: INTEL 8085 & 8086 MICROPROCESSOR ARCHITECTURE:

8085

Architecture of 8085, Main features, Address and Data bus, Pin Diagram, Register organization, Addressing Modes

8086

Main features, pin diagram/description, 8086 microprocessor family, 8086 internal architectures, bus interfacing unit, execution unit, 8086 system timing, minimum mode and maximum mode configuration.

UNIT-II: 8086 PROGRAMMING:

Addressing modes, Program development steps instruction set, assembler & directives, writing simple programs with an assembler, assembly language programs

UNIT-III: 8086 INTERFACING:

I/O INTERFACE: 8255 PPI, Various Modes of Operation and Interfacing to 8086, D/A and A/D Converter, Stepper motor, keyboard interfacing, LED, 7-segment display, Interfacing of DMA controller 8257

INTERFACING WITH ADVANCED DEVICES: Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine, architecture of 8279.

COMMUNICATION INTERFACE: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT-IV: INTRODUCTION TO MICROCONTROLLERS:

Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing

Modes and Instruction set of 8051, Simple Programs, memory interfacing to 8051

UNIT -V

8051 REAL TIME CONTROL: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters, Interfacing: keyboard, displays (LED, 7-segment display unit), A/D and D/A converters.

Text Books:

1. Microprocessors and Interfacing – Programming and Hard ware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rdEdition.
2. The 8051 Microcontroller & Embedded Systems Using Assembly and C by Kenneth J.Ayala, DhananjayV.Gadre,CengageLearninbg , India Edition.Advanced Microprocessors and Peripherals KM Bhurchandi, AK Ray (3rd Edition)

Reference Books:

1. The Intel Microprocessors-Architecture, Programming, and Interfacing by Barry B.Brey, Pearson, Eighth Edition
2. Microprocessors and Microcontrollers by N.Senthil Kumar, M.Saravanan andS.Jeevananthan, Oxford University Press, Seventh Impression.

B. Tech V Semester

L	T	P	C
3	0	0	3

18EC5T03-Digital Signal Processing

Course Objectives: Students undergoing this course, are expected to

1. Analyze the Discrete Time Signals and Systems
2. Know the importance of FFT algorithm for computation of Discrete Fourier Transform
3. Understand the various implementations of digital filter structures
4. Learn the FIR and IIR Filter design procedures
5. Know the need of Multirate Processing

Course Outcomes: After undergoing the course, students will be able to

1. Apply the difference equations concept in the analyzation of Discrete time systems
2. Use the FFT algorithm for solving the DFT of a given signal
3. Design a Digital filter (FIR&IIR) from the given specifications
4. Realize the FIR and IIR structures from the designed digital filter.
5. Use the Multirate processing concepts in various applications

UNIT 1:INTRODUCTION:

Introduction to Digital Signal Processing: Discrete time sequences, Classification of Discrete time signals and systems, stability of LTI systems, Response of LTI systems to arbitrary inputs, Review of Z-transforms, solution of difference equations using Z-transforms,System function.

UNIT II: DISCRETE FOURIER SERIES & FOURIER TRANSFORMS:

Introduction of discrete Fourier series,DFS representation of periodic sequences, Discrete Fourier transforms &it‘s Properties, Inverse FFT, Frequency domain representation of discrete time signals and systems.

Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms for DFT calculation.

UNIT III: DESIGN OF IIR DIGITAL FILTERS& REALIZATIONS:

Basic structures of IIR systems-Direct form 1,Direct form 2, transposed and cascade structures, Analog to Digital frequency transformation techniques, Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters

UNIT IV:DESIGN OF FIR DIGITAL FILTERS & REALIZATIONS:

Basic structures of FIR systems- Direct form,cascade,Lattice and Lattice-ladder structuresCharacteristics of FIR Digital Filters, Design of FIR Digital Filters using Window Techniques- Rectangular and Hamming windows, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT V: MULTIRATE DIGITAL SIGNAL PROCESSING:

Introduction, Decimation,Interpolation, Sampling rate conversion,Applications – Sub-band Coding of SpeechSignals, Implementation of Digital Filter Banks, Trans-multiplexers.

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, DimitrisG.Manolakis,Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI,2008

Reference Books:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill, 2006
2. Digital Signal Processing: MH Hayes, Schaum‘s Outlines, TATA Mc-Graw Hill, 2007.

B. Tech V Semester	L	T	P	C
	2	0	0	2

18EC5T04- INTELLECTUAL PROPERTY RIGHTS

Course Objective – The students will be enlightened with all the fundamental concepts of Intellectual Property Rights, disseminate knowledge on patents, trademarks and registration of copyrights.

Course Outcomes-

1. To introduce the various concepts relating to Intellectual Property Rights and Patents.
2. To impart knowledge on various aspects relating to laws relating to patents in India.
3. To indulge the process of registering for copyrights and trademarks.

Course Content-

UNIT I: Introduction to Intellectual Property Rights (IPR) - Concept of Property - Introduction· to IPR - International Instruments and IPR – WIPO –TRIPS – WTO – Laws relating to IPR – Agencies for IPR Registration - Use and Mis use of Intellectual property rights.

UNIT II: Patents - Introduction to Patents – Laws relating to Patents in India – Patent registration and Granting of Patent – Exclusive Rights – Limitations – Ownership and Transfer – Double Patenting.

UNIT III: **Copyrights and Trademarks –** Principles of Copyright Protection – Law relating to Copyrights - Copyright Ownership – Transfer and Duration – Infringement of Copyright

Introduction to Trademark – Laws relating to Trademark – Distinction between Trademark and Property Mark – Trade mark Registration and Maintenance

UNIT IV: **Trade Secrets-** Introduction to Trade Secrets – General Principles – Laws relating to Trade secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements.

UNIT V: Cyber Law and Cyber Crime – Introduction to Cyber law – Information Technology act 2000 – Protection of online and Computer Transactions – E-Commerce – Cyber Crimes – Prevention and punishment.

REFERENCE BOOKS

1. Deborah E.Bouchoux: ―Intellectual Property‖. Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal ―Fundamentals of IPR for Engineers‖, BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western‘s Special Topics Collections
4. Prabhuddha Ganguli: _ Intellectual Property Rights‖ Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: ―Intellectual Property‖, Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: ―Intellectual Property Rights‖, Excel Books. New Delhi.
7. M. Ashok Kumar and Mohd. Iqbal Ali: ―Intellectual Property Right‖ Serials Pub.

B. Tech V Semester

L	T	P	C
3	0	0	3

18EC5T05-Quantitative Aptitude & Reasoning
(OPEN ELECTIVE-I)

Syllabus:

Unit-I: Divisibility and remainder rules of numbers, Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II: Profit & loss, Simple interest and Compound interest Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III: Ratio & proportions, Partnership, Alligation and mixtures and Ages. Data sufficiency, Inequalities and Decision making .

Unit-IV: Time and work, Pipes & cisterns and Time and distance . Syllogism, Statement and course of action and Statement and Assumption.

Unit-V: Boats and streams, Areas, Volume and surface areas. Statement and argument, Cause and effect and Drawing inference.

Text Books: 1. “Objective Arithmetic” by R.S. Agarwal, S. Chand Publications. 2. Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

Reference Books: 1.Quantitative Aptitude by Dinesh Khattar, Pearson Education. 2.Quantitative Aptitude by Abhjit Guha. 3.Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T06-SOLID STATE DEVICES AND CIRCUITS
(OPEN ELECTIVE-I)

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of Semiconductor physics
2. Familiarize with various diodes and characteristics.
3. Familiarize with the transistors and their configurations.
4. Disseminate Amplifications with transistors
5. Understand the operation and working of Oscillators

Course Outcomes: After undergoing the course, students will be able to
1. Understand importance of semiconductors.
2. Analyze Diodes characteristics.
3. Differentiate various configurations.
4. Design amplifiers at different applications using transistor.
5. Analyze different oscillators design.

Unit I: Basics Concepts of Semiconductor Physics
Charged Particles, Field Intensity, Potential, Energy, the eV unit of energy, Energy Band theory of Crystals, Insulators, Semiconductors and metals, Mobility and Conductivity, Electrons and Holes, Donor and Acceptor impurities, Charge Densities in a Semiconductor, Electrical properties of Ge and Si, Hall Effect, Diffusion and Drift Currents, Mass action Law, Fermi-Dirac distribution.

Unit II: Diodes
PN junction diode- Energy band diagram of PN junction Diode- V-I Characteristics –Currentcomponents in PN junction Diode- Diode equation- Diode resistance and capacitance Characteristics of Zener Diode, Varactor Diode- SCR and UJT.

Unit III: Transistors
Bipolar Junction Transistor: Transistor current components- Transistor equation- Transistor configurations- Characteristics of a transistor in CB,CC& CE configurations- Transistor as a Switch- Transistor as an amplifier.
Field Effect Transistors (FET): Junction Field Effect Transistor construction & operation- characteristics CS, CD & CG

Unit IV:Small Signal Transistor Amplifier models:
Low Frequency Transistor Amplifier Models: Two port network, Transistor hybrid model, determination of h- parameters, generalized analysis of transistor amplifier model using h-parameters

Unit V: Feedback Amplifiers and Oscillators
Negative Feedback: Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers
Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and Wein bridge oscillators with BJT and their analysis. Generalized analysis of LC Oscillators, Hartley and Colpitt‘s oscillators with BJT and their analysis.

Text Books:

1) Millman, Halkias, ―Integrated Electronics- Analog and Digital Circuits and Systems‖, TMH.
2).Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill,Second Edition.

Reference Books:

1) Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.
2) . Basic Electronic Circuits -V.K.Mehta,S-chand Publications,2008.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T07-PRINCIPLES OF COMMUNICATION
(OPEN ELECTIVE-I)

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Familiarize with the fundamentals of digital communication systems
4. Familiarize with various techniques for digital modulation and demodulation of signals
5. Distinguish the figure of merits of various analog modulation methods

Course Outcomes: After undergoing the course, students will be able to
1. Differentiate various Analog modulation schemes
2. Analyze demodulation schemes and their spectral characteristics
3. Differentiate various Digital modulation schemes
4. Analyze demodulation schemes and their spectral characteristics
5. Analyze noise characteristics of various analog modulation methods

UNIT I
Introduction: Overview of Communication system, Communication channels, Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double sideband with Carrier (DSB-C), Double side band without Carrier DSB-SC, Single Side Band Modulation SSB, Modulators and Demodulators, Vestigial Side Band (VSB), Quadrature Amplitude Modulator, Radio Transmitter and Receiver

UNIT II
Angle Modulation, Frequency and Phase modulation, frequency deviation, Bandwidth, FM Modulators and Demodulators, Narrow band and wide band FM, FM Broadcasting.

UNIT III
Pulse digital Transmission of Analog Signals: Sampling Theorem and its applications, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation, Generation and Demodulation, PCM System Issues in digital transmission: Frequency Division Multiplexing Time Division Multiplexing

UNIT IV
Digital Representation of Analog Signals Pulse Code Modulation (PCM), Differential Pulse Code Modulation, Delta Modulation. Adaptive Delta Modulation, Sources of Noises, Frequency domain representation of Noise, Super position of Noises, Linear filtering of Noises, Mathematical Representation of Noise.

UNIT V
Noise in Amplitude Modulation: Analysis, Signal to Noise Ratio, Figure of Merit. Noise in Frequency Modulation: Pre-emphasis, De-Emphasis and SNR Improvement, Phase Locked Loops Analog and Digital.

Text Book:
1. Herbert Taub and Donald L. Schilling, ―Principles of Communication Systems‖, Tata McGrawHill.
2. RishabhAnand, Communication Systems, Khanna

Reference Books:

1. B.P.Lathi,–ModernDigitalandAnalogcommunicationSystems‖,3rd Edition, Oxford University Press.
2. Simon Haykin, ―Communication Systems‖, 4th Edition, Wiley India.

B. Tech V Semester

L	T	P	C
0	0	3	1.5

18EC5L08-MICROCONTROLLER ANDMICROPROCESSORS LAB

PART- A:(Minimum of 5 Experiments has to be performed)
8086 Assembly Language Programming using Assembler Directives

1. Sorting.
2. Multibyte addition/subtraction
3. Sum of squares/cubes of a given n-numbers
4. Addition of n-BCD numbers
5. Factorial of given n-numbers
6. Multiplication and Division operations
7. Stack operations
8. BCD to Seven segment display codes

PART- B: (Minimum of 3 Experiments has to be performed) 8086 Interfacing

1. Hardware/Software Interrupt Application
2. A/D Interface through Intel 8255
3. D/A Interface through Intel 8255
4. Keyboard and Display Interface through Intel 8279
5. Generation of waveforms using Intel 8253/8254

PART- C: (Minimum of 3 Experiments has to be performed) 8051 Assembly Language Programs

1. Finding number of 1‘s and number of 0‘s in a given 8-bit number
2. Addition of even numbers from a given array
3. Ascending / Descending order
4. Average of n-numbers

PART-D: (Minimum of 3 Experiments has to be performed) 8051 Interfacing

1. Switches and LEDs
2. 7-Segment display (multiplexed)
3. Stepper Motor Interface
4. Traffic Light Controller

B. Tech V Semester	L	T	P	C
	0	0	3	1.5

18EC5L09-Digital Signal Processing Laboratory

List of Experiments

1. Generation of basic sequences like impulse,unit step, ramp. Sinusoidal, co-sinusoidal, exponentially growing and decaying sequences.
2. Verification of linear convolution.
3. Verification of circular convolution.
4. DFT of an N-point sequence
5. IDFT of an N-point sequence
6. Frequency response of IIR low pass and high pass Butterworth filters
7. Frequency response of IIR lowpass and high pass Chebyshev filters
8. Frequency response of FIR low pass filter using Rectangular and Hamming Windows
9. Decimation.
10. Interpolation

Software needed: MATLAB

B. Tech V Semester

L	T	P	C
1	0	2	2

18EC5L10-Communication Systems Laboratory

List of Experiments

All the experiments should be performed in Hardware and software (MATLAB)

1. Amplitude modulation(AM)- Modulation and demodulation
2. DSB-SC Modulation and demodulation
3. SSB-SC Modulation and demodulation
4. Frequency Modulation and demodulation
5. PCM Modulation and demodulation
6. DPCM Modulation and demodulation
7. DM Modulation and demodulation
8. ASK Modulation and demodulation
9. FSK Modulation and demodulation
10. PSK Modulation and demodulation
11. Sampling theorem
12. Time division Multiplexing

Equipment required for Laboratories:

1. RPS – 0 – 30 V
2. CRO – 0 – 20 M Hz.
3. Function Generators – 0 – 1 M Hz
4. RF Generators – 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for analog and Digital Communication
7. Components

B. Tech V Semester	L	T	P	C
	3	0	0	0

18EC5N11-Essence of Indian Traditional Knowledge

Objectives:
To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

1. The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2. To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3. The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4. To know the student traditional knowledge in different sector.

Course Outcomes: After completion of the course, students will be able to:

1. understand the concept of Traditional knowledge and its importance
2. know the need and importance of protecting traditional knowledge
3. know the various enactments related to the protection of traditional knowledge.
4. understand the concepts of Intellectual property to protect the traditional knowledge

Unit-I:
Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

Unit-II:
Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Unit-III:
Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Unit-IV:
Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Unit-V:
Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

E-Resources:

1. https://www.youtube.com/watch?v=LZP1StpYEPM 2.http://nptel.ac.in/courses/121106003/

SEMESTER-VI

SYLLABUS

B. Tech VI Semester	L	T	P	C
	3	0	0	3

18EC6T01 -VLSI DESIGN

COURSE OBJECTIVE:

1. To learn basic MOS and CMOS characteristics and Layout diagram
2. To learn static and dynamic CMOS design
3. To learn sequential logic circuits and design strategies
4. To learn the concepts of designing Low power VLSI Subsystems.
5. To learn the concepts of testing and implementation techniques

COURSE OUTCOME: After completion of the course student will be able to:

1. Model the behavior of a MOS Transistor
2. Design combinational and sequential circuits using CMOS gates
3. Design the low power circuits.
4. Implement design on FPGA.
5. Perform Testing and implementation techniques

UNIT I- INTRODUCTION

Evolution of IC technology, Comparison of IC and Discrete , IC fabrication Process, MOS Fabrication Process, CMOS fabrication Process.

MOS TRANSISTOR

Operation of NMOS and PMOS transistors, V-I characteristics of MOS, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling, CMOS Voltage Transfer Characteristics, Scaling principles and fundamental limits, power consumption and effect of scaling on CMOS performance metrics, propagation delays, Latch up Susceptibility, Stick diagram, Layout diagrams .

UNIT II -COMBINATIONAL LOGIC CIRCUITS

Examples of Combinational Logic Design, Elmore‘s constant, Ratioed Logic, Pass transistor Logic, Dynamic logic, static and dynamic CMOS design, Speed and Power in dynamic logic, cascading dynamic gates, CMOS Transmission gates.

UNIT III- SEQUENTIAL LOGIC CIRCUITS

Static and Dynamic Latches and Registers, Timing issues : Synchronous timing basics, Classification, Skew, Jitter and their sources, pipelines, clock strategies, Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design.

UNIT IV DESIGNING ARITHMETIC BUILDING BLOCKS-

Data path circuits, Architectures for ripple carry adders, carry look ahead adders, High speed adders, accumulators, Multipliers, speed and area trade-off.

LOW POWER DESIGN

Low – Power CMOS Logic Circuits: Introduction, Overview of Power Consumption, Low – Power Design through voltage scaling, Estimation and Optimization of switching activity.

UNIT V -DESIGN FOR TESTABILITY

Design for Testability: Introduction, Fault Types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based and BIST Techniques

IMPLEMENTATION STRATEGIES

Full custom and Semi-custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures.

Text Book:

1. Sung-Mo Kang &YosufLeblebici, ―CMOS Digital Integrated Circuits: Analysis & Design‖,Mcgraw Hill, 4th Edition.
2. . D. A. Pucknell and K. Eshraghian, ―Basic VLSI Design: Systems and Circuits‖, PHI, 3rd Ed.,1994.

Reference Books:

1. Neil H.E. Weste, David Money Harris, ―CMOS VLSI Design – A circuits and Systems Perspective‖ Pearson, 4th Edition
2. Jan M. Rabeay, ―Digital Integrated Circuits-A Design Perspective‖, PHI, 2nd Ed.

B. Tech VI Semester	L	T	P	C
	3	0	0	3

18EC6T02-ANTENNAS AND WAVE PROPAGATION

Course Overview:

It gives comprehensive study of basic antenna fundamentals, types of antennas, radiation pattern, main lobes and side lobes. Student will come to know how the different antennas work, student also gain knowledge in microwave antennas, antenna arrays. Wave propagation concepts, frequency range, transmission losses, calculations, space wave propagation, and troposphere wave propagation.

Prerequisite(s): Electromagnetic waves and Transmission Lines.

Course Objectives:

1. To understand the basic terminology and concepts of Antennas.
2. To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
3. Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
4. To have knowledge on antenna operation and types as well their usage in real time field.
5. Aware of the wave spectrum and respective band based antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure. **Course Outcomes:**

After going through this course the student will be able to

1. Define various antenna parameters
2. Analyze radiation patterns of antennas
3. Evaluate antennas for given specifications
4. Illustrate techniques for antenna parameter measurements
5. Design antennas for specific applications

SYLLABUS

UNIT-I

ANTENNA BASICS:

Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity- Gain-Resolution, Effective height, Antenna Apertures, Friis transmission formula, Illustrative problems. Fields from oscillating dipole, Antenna temperature, front–to-back ratio, basic Maxwell's equations, retarded Potential- Helmholtz Theorem, Radiation from Small Electric Dipole, Quarter wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Directivity, Effective Area and Effective Height, Natural current distributions, far fields.

UNIT- II

THIN LINEAR WIRE ANTENNAS:

Small Electric Dipole, Quarter wave Monopole and Half Wave Dipole, Long wire antennas, V-antennas, Rhombic Antennas, Small Loop antennas, Helical Antennas, Design Relations.

UNIT-III

ANTENNA ARRAYS:

Two element array, Principle of Pattern Multiplication, N element Uniform Linear Arrays - Broadside, End fire Arrays, EFA with Increased directivity, Binomial Arrays, Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array

UNIT-IV

MICROWAVE ANTENNAS:

Reflector Antennas: Yagi Uda Antenna, Flat Sheet and Corner Reflectors, Paraboloidal Reflectors, Prime focus horn, offset fed and Cassegrain Feeds, Slot antennas-Babinet's principle, Microstrip (patch) antennas, Lens antennas **ANTENNA MEASUREMENT THEORY:**

Antenna Measurements-Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and Three Antenna Methods)

UNIT-V

WAVE PROPAGATION:

Overview of propagation effects, Flat and Spherical Earth Considerations, Ground Wave propagation, Sky Wave Propagation Formation of Ionospheric Layers and their characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance, Virtual Height, Space Wave Propagation, Duct Propagation, Tropospheric Scattering, Fading and Multipath.

TEXT BOOKS:

1. E. C. Jordan and K. G. Balmain, ―Electromagnetic Waves and Radiating Systems‖, PHI, 2nd edition, 2000.
2. John D. Kraus and Ronald J. Marhefka, ‖Antennas and Wave propagation‖ TMH, 4th Edition, 2010

REFERENCES:

1. G.S.N Raju, ―Antennas and Wave Propagation‖, 1st Edn Pearson Education, 2004.
2. C.A. Balanis, ―Antenna Theory Analysis and Design‖, 4th Edn., John Wiley & Sons, 2016.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T03-CELLULAR AND MOBILE COMMUNICATIONS (PROFESSIONAL ELECTIVE 1)

COURSE OBJECTIVE: Students should familiarize with different cellular systems, channel allocations with bandwidth utilizations, signal traffic in cellular systems, frequency management and handoffs.

COURSE OUTCOMES:

The student will be introduced to:

1. Understand the basic cellular concepts like frequency reuse, cell splitting, cell sectoring etc., and various cellular systems.
2. Understand the different types of interference s influencing cellular and mobile communications.
3. Understand the frequency management, channel assignment and various propagation effects in cellular environment.
4. Understand the different types antennas used at cell site and mobile.
5. Understand the concepts of handoff and types of handoffs.

UNIT I

CELLULAR SYSTEMS:

Limitations of Conventional System , Basic Cellular Mobile System ,First, second ,third and fourth Generation cellular wireless systems .Operation of Cellular System .

Fundamentals of cellular Radio System Design: concept of frequency reuse channels, Co-channel Interference, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system

UNIT II

CO-CHANNEL & NON CO-CHANNEL INTERFERENCE: Measurement of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects

Non-cochannel interference-adjacent channel interference, Near End far end interference,

UNIT III

CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, and general formula for mobile propagation over water and flat open area, near and long distance propagation.

UNIT IV

CELL SITE AND MOBILE ANTENNAS: Space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, Mobile Antennas.

Frequency Management And Channel Assignment : Numbering and grouping, setup access and paging channels ,channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells

UNIT V

HANDOFFS: Handoff Initiation, types of handoff, delaying handoff, advantages of Handoff, power difference handoff, forced handoff, mobile assisted and soft handoff. Intersystem handoff

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn.,2006.
2. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn.,2002.

REFERENCES:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition,2001.
2. Modern Wireless Communication –Simon Haykin Michael Moher, Persons Eduction,2005.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T04-INTERNET OF THINGS
(PROFESSIONAL ELECTIVE 1)

Prerequisites :Fundamentals of Computer Network, Computer Network Course

Objectives :
1. To understand what Internet of Things is.
2. To get basic knowledge of RFID Technology, Sensor Technology and Satellite Technology.
3. To make students aware of resource management and security issues in Internet of Things.

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

1. Explain what Internet of Thins is.
2. Describe key technologies in Internet of Things.
3. Understand wireless sensor network architecture and its framework along with WSN applications.
4. Explain resource management in the Internet of Things.
5. Explain Internet Of Things Privacy, Security And Governance

UNIT - I INTRODUCTION
What is the Internet of Things? : History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities

UNIT - II FUNDAMENTAL IoT MECHANISMS AND KEY TECHNOLOGIES
Identification of IoT Objects and Services, Structural Aspects of the IoT, Environment Characteristics, Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture, Key IoT Technologies, Device Intelligence, Communication Capabilities, Mobility Support, Device Power, Sensor Technology, RFID Technology, Satellite Technology.

UNIT - III RADIO FREQUENCY IDENTIFICATION TECHNOLOGY RFID:
Introduction, Principle of RFID, Components of an RFID system, Issues EPCGlobal Architecture Framework: EPCIS & ONS, Design issues, Technological challenges, Security challenges, IP for IoT, Web of Things. Wireless Sensor Networks: History and context, WSN Architecture, the node, Connecting nodes, Networking Nodes, Securing Communication WSN specific IoT applications, challenges: Security, QoS, Configuration, Various integration approaches, Data link layer protocols, routing protocols and infrastructure establishment.

UNIT - IV RESOURCE MANAGEMENT IN THE INTERNET OF THINGS
Clustering, Software Agents, Clustering Principles in an Internet of ThingsArchitecture, Design Guidelines, and Software Agents for Object Representation, Data Synchronization. Identity portrayal, Identity management, various identity management models: Local, Network, Federated and global web identity, user-centric identity management, device centric identity management and hybrid-identity management, Identity and trust.

UNIT - V INTERNET OF THINGS PRIVACY, SECURITY AND GOVERNANCE
Vulnerabilities of IoT, Security requirements, Threat analysis, Use cases and misuse cases, IoT security

tomography and layered attacker model, Identity establishment, Access control, Message integrity, Non-repudiation and availability, Security model for IoT.

Text Books

1. Daniel Minoli, ―Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications‖, ISBN: 978-1-118-47347-4, Willy Publications
2. Bernd Scholz-Reiter, Florian Michahelles, ―Architecting the Internet of Things‖, ISBN 978-3- 642-19156-5 e- ISBN 978-3-642-19157-2, Springer

Reference Books

1. HakimaChaouchi, ― The Internet of Things Connecting Objects to the Web‖ ISBN : 978-1- 84821-140-7, Willy Publications
2. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, ISBN: 978-1-119-99435-0, 2 nd Edition, Willy Publications

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T05-DSP PROCESSORS AND ARCHITECTURE
(PROFESSIONAL ELECTIVE 1)

COURSE OBJECTIVE: Students able to familiarize with DSP systems, Discrete transforms, digital filters design procedures, Computations and accuracy with DSP systems, programmable DSP systems and different DSP processors and architectures.

COURSE OUTCOMES: After completion of the course students able to
1. Evaluate the transformations and design of filters
2. Compute the accuracy and errors in DSP implementations
3. Analyze the Architectures of DSP systems
4. Write program for DSP and able to distinguish with GPP
5. Distinguish different DSP families.

UNIT-I

Introduction to Digital Signal Processing Introduction, a Digital signal processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

UNIT-II

Computational Accuracy in DSP Implementations Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-III

Architectures for Programmable DSP Devices Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-IV

Programmable Digital Signal Processors Commercial Digital signal processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54XX Processors.

UNIT-V

Analog Devices Family of DSP Devices Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor. Introduction to Black fin Processor - The Black fin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications- B. Venkataramani and M. Bhaskar, 2002, TMH.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T06-OOPS Through JAVA

COURSE OBJECTIVES:

1. Understanding the OOPS concepts classes and objects, threads, files, applets, swings and act
2. The course introduces computer programming using the Java programming language with object-oriented programming principles.
3. Emphasis is placed on event driven programming methods, including creating and manipulating objects, classes and using Java for network level programming and middleware development.

COURSE OUTCOMES:

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

1. Understand the principles of object oriented concepts. Define classes and objects by identifying real world entities, their properties and functionalities.
2. Reuse the existing classes by using inheritance and understand the concepts of packages and exception handling.
3. Make use of built-in classes in Java and understand the concept of thread.
4. Develop user interfaces using applets, AWT and Event handling in java.
5. Create portable GUI applications using Swing components.

SYLLABUS:

UNIT-I:

Introduction to OOP, procedural programming language vs object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector.

UNIT-II:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

Exception handling, importance of try, catch, throw, throws and finally block, userdefined exceptions, Assertions.

UNIT-III:

Multithreading: Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-IV:

Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

UNIT-V:

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List, Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

TEXT BOOKS:

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.
3. JAVA for Beginners,4e,JoyceFarrell,Ankit R. Bhavsar,Cengage Learning.
4. Object oriented programming with JAVA,Essentials and Applications, Raj Kumar Bhuyya,Selvi,Chu,TMH.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1.Java Programming,K.Rajkumar.Pearson
2.Core Java,BlackBook,RNageswararao,Wiley,Dream Tech 3.Core Java for Beginners, Rashmi Kanta Das, vikas.
4.Object Oriented Programming Through java, P.Radha Krishna,Universities Press

B. Tech VI Semester	L	T	P	C
	3	0	0	3

18EC6T07-Employability skills 2
(OPEN ELECTIVE-II)

COURSE OBJECTIVES:

COURSE OUTCOMES:

SYLLABUS:

Unit-I:
Divisibility and remainder rules of numbers,Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II:
Profit & loss, Simple interest and Compound interest Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III:
Ratio & proportions, Partnership, Alligation and mixtures and Ages.Data sufficiency, Inequalities and Decision making .

Unit-IV:
Time and work, Pipes & cisterns and Time and distance .Syllogism, Statement and course of action and Statement and Assumption.

Unit-V:
Boats and streams, Areas, Volume and surface areas.Statement and argument, Cause and effect and Drawing inference.

Text Books:
1) ―Objective Arithmetic‖ by R.S. Agarwal, S. Chand Publications.
2) Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

REFERENCES:
1) Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2) .Quantitative Aptitude by Abhjit Guha.
3) Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T08-Computer Networks
(OPEN ELECTIVE-II)

OBJECTIVES:

- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis—

OUTCOMES:

1. Understand OSI and TCP/IP models
2. Analyze MAC layer protocols and LAN technologies
3. Design applications using internet protocols
4. Understand routing and congestion control algorithms
5. Understand how internet works

UNIT – I

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT– II

Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing,Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window
Protocols

UNIT – III

The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-N- A Protocol Using Selective Repeat

UNIT – IV

The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Multiple Access Protocols- Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet Physical Layer-Classic Ethernet MAC Sublayer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-Gigabit Ethernet-Retrospective on Ethernet, Wireless Lans-The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sublayer Protocol-The 805.11 Frame Structure-Services

UNIT – V

Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service- Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Congestion Control Algorithms-Approaches to Congestion Control-Traffic Aware Routing- Admission Control-Traffic Throttling-Load Shedding.

Transport Layer – The Internet Transport Protocols: Udp, the Internet Transport Protocols: Tcp Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers,

Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery

TEXT BOOKS:

1. Computer Networks, Tanenbaum and David J Wetherall, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie, ―Computer Networks - A Systems Approach‖ (5th ed), Morgan Kaufmann/ Elsevier, 2011
2. An Introduction to Computer Networks - Second Edition, Peter Lars Dordal, Loyola University of Chicago Copyright Year: 2014

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T09-EMBEDDED STSTEMS
(OPEN ELECTIVE-II)

OBJECTIVES:

1. Technology capabilities and limitations of the hardware, software components
2. Methods to evaluate design tradeoffs between different technology choices.
3. Design Methodologies

OUTCOMES:

Understand the basics of an embedded system
1. Program an embedded system
2. Design, implement and test an embedded system.
3. Identify the unique characteristics of real-time systems
4. Explain the general structure of a real-time system
5. Define the unique design problems and challenges of real-time systems

Syllabus

UNIT-I:

Introduction to Embedded systems:What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples

UNIT-II:

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher‘s problem.

UNIT-IV:

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V:

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009
2. Embedded Systems: A Contemporary Design Tool Paperback by James K. Peckol

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.

B. Tech VI Semester	L	T	P	C
	0	0	3	1.5

18EC6L10-VLSI DESIGN LAB

COURSE OBJECTIVES:

1. To study understand the MOS device at device , circuit and layout level
2. To learn the implementation of designed circuit on FPGA Board

COURSE OUTCOMES:

At the end of the course the students can able to

1. Design and analyse the MOS at device, circuit and layout level using back end CAD tool.
2. Design of combinational and sequential circuit using CAD tool
3. Design of Combinational and sequential circuit at gate level using Front end tool.

Experiment List:

1. To Study about PSPICE tool and λ (Lambda) Rules for Layout Generation.
2. To study electrical characteristics of NMOS (use 0.25um model) . Observe the variation in characteristics with the variation in process parameter.
3. Design CMOS Inverter with given specifications. Obtain the following:

a) Voltage transfer curve.
b) Propagation delay
c) Tphl and Tplh
d) Noise Margin

Compare the measured results with theoretical results.

4. Design and Implement 6T XOR gate .
5. Design and Implementation of 4-bit full adder and analyse power, area and timing.
6. Design D-latch and analyze the power, area and timing
7. Design 2-input CMOS NAND gate. Verify the logic and compare result of pre-layout and post layout.

Obtain the following for Experiment No. 1-7:

a. Draw the schematic and verify the following
i) DC Analysis
ii) Transient Analysis
b. Draw the Layout and verify the DRC, ERC
c. Check for LVS
d. Extract RC and back annotate the same and verify the Design
e. Verify & Optimize for Time, Power and Area to the given constraint

8. Write Verilog Code for the following circuits and their Test Bench for verification, observe the waveform and synthesize the code with technological library with given constraints*. Do the initial timing verification with gate level simulation.

i. An inverter
ii. A Buffer
iii. Transmission Gate
iv. Basic/universal gates
v. Flip flop -RS, D-FF, JK, Master Slave JK FF, T-FF

9. Write Verilog Code for the following circuits and their Test Bench for verification, observe the waveform and synthesize the code with technological library with given constraints*. Do the initial timing verification with gate level simulation.

i. Serial & Parallel adder
ii. 4-bit counter [Synchronous and Asynchronous counter]

10. Design and Implement Traffic Light Controller on FPGA Board.

B. Tech VI Semester	L	T	P	C
	0	0	3	1.5

18EC6L11- OOPS through JAVA lab

COURSE OUTCOMES:

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

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling.

LIST OF LAB EXPERIMENTS:

Exercise - 1 (Basics)

a). Write a JAVA program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a). Write a JAVA program to implement Single Inheritance.

b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for ―super‖ keyword. b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)

a). Write a JAVA program Illustrating exception handling keywords. b). Write a JAVA program for creation of Java Built-in Exceptions c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class. b). Write a program illustrating **isAlive** and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package. c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse. b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

B. Tech VI Semester

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18EC6L12-Technical Seminar

The students are required to select current challenges and develop orientation skills relevant to the Electronics and Communication. The technical seminar should be given by individual student. The seminar topic should be innovative in development; student should give presentation and demonstration of seminar work study. The students are required to submit document of seminar report at the end.

COURSE OUTCOMES:

After going through this course the student will be able to

- Define the real world problems
- Acquire knowledge to solve and address the problem
- Improve presentation skills and writing skills
- Involve in both theoretical and practical survey work

The evaluation of Technical Seminar is done based on

1. Relevance of the Topic
2. Literature Survey
3. New Information involved in the Topic
4. Current age Acceptance of Seminar
5. Presentation and Communication skill of student
6. Seminar Report given by the Student

SEMESTER- VII

SYLLABUS

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T01-DIGITAL IMAGE PROCESSING

Course Objectives:

1. To comprehend the relation between human visual system and machine perception and processing of digital images.
2. To provide a detailed approach towards image processing applications like enhancement, segmentation, and compression.

Course Outcomes: After Going Through This Course the Student Will

1. Exploration of the limitations of the computational methods on digital images.
2. Expected to implement the spatial and frequency domain image transforms on enhancement and restoration of images.
3. Elaborate understanding on image enhancement techniques.
4. Understand image segmentation techniques.
5. Expected to define the need for compression and evaluate the basic compression algorithms.

UNIT - I Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT - II Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering. Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT - III Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT – IV Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation.

Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT - V Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- MC GRAW HILL 2010

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - ScotteUmbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, MC GRAW HILL EDUCATION, 2010.

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B. Tech VII Semester	L	T	P	C
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18EC7T02-Micro Wave Engineering

Course Overview:
To adopt microwave technology in diverse applications as radio astronomy, long distance communication, space navigation, radar systems, medical equipment and missile electronic systems. Because microwave communication system handles a large fraction of the world‘s international and other long-haul telephone, data and television transmissions. To use microwave technology in wireless communication system such as Direct Broadcast Satellites (DBS) television, personal communication system (PCS), Wireless Local Area Networks (WLAN‘s), Cellular Video (CV) Systems, and global positioning Satellite (GPS) Systems operate in the frequency of range (1.5 GHZ to 94 GHZ). Thus really heavily on microwave technology.
Prerequisite(s): Electromagnetic waves and Transmission Lines, Antenna and wave Propagation.
Course Objectives:
The Student Will
1. Understand Fundamental Electrical Characteristics of Waveguides and Transmission Lines Through Electromagnetic Field Analysis.
2. Understand The Basic Properties of Polarization and Ferrite Materials Composition in The Case of Waveguide Components.
3. Understand The Multiport Junction Concept for Splitting the Microwave Energy in A Desired Direction.
4. Understand The Function, Design, And Integration of the Major Microwave Components Like Oscillator, Modulator, Power Amplifier, Filter
5. Familiarize Mixer in Building a Microwave Test Bench Setup for Measurements.

Course Outcomes:
After Going Through This Course the Student Will
1. Gain Knowledge of Transmission Lines and Waveguide Structures and How They Are Used as Elements in Impedance Matching and Filter Circuits.
2. Apply Analysis Methods to Determine Circuit Properties of Passive or Active Microwave Devices.
3. Gain Knowledge and Understanding of Microwave Analysis Methods.
4. Distinguish Between M-Type and O-Type Tubes
5. Analyze and Measure Various Microwave Parameters Using a Microwave Test Bench

SYLLABU
S UNIT I
RECTANGULAR & CIRCULAR WAVEGUIDES:
Introduction to microwave communication and EM spectrum, Rectangular wave guide: Field Components, TE, TM Modes, Dominant TE10 mode, Field Distribution, Power, Attenuation. Circular waveguides: TE, TM modes. Wave velocities, Micro strip transmission line (TL), Coupled TL, Strip TL, Coupled strip line, Coplanar TL, Microwave cavities

UNIT II
PASSIVE MICROWAVE DEVICES:
Scattering matrix, Passive microwave devices: Microwave hybrid circuits, Terminations, Attenuators, Phase Shifters, Directional couplers: Two-hole directional couplers, S- Matrix of a directional coupler, Hybrid couplers, Microwave propagation in ferrites, Faraday rotation, Isolators, Circulators. S-parameter analysis of all components.
UNIT III MICROWAVE TUBES:
Microwave tubes: Limitations of conventional active devices at microwave frequency, two cavity Klystron, Reflex Klystron, Magnetron, Traveling wave tube, Backward wave oscillators,

UNIT IV

SOLID STATE AMPLIFIERS AND OSCILLATORS:

Transferred electron devices: Gunn-effect diodes & modes of operation. Avalanche transit – time devices: IMPATT diode, TRAPPAT diode, BARITT diode.

UNIT V

MICROWAVE MEASUREMENTS:

Microwave power measurement, Insertion loss and attenuation measurement, VSWR measurement, Frequency measurement, measurement of cavity Q, Dielectric constant measurement of a solid.

TEXT BOOKS:

1. Samuel Y. Liao, ―Microwave Devices and Circuits‖, 3rd Edition, Pearson Education, 2011 Reprint.
2. Collin.R.E, ―Foundations For Microwave Engineering‖, 2nd Edition, Tata Mcgraw Hill, 2006.

REFERENCES:

1. Microwave and Radar Engineering – G Sasibhushana Rao Pearson
2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.

B. Tech VII Semester	L	T	P	C
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18EC7T03-Wireless Sensor Network
(PROFESSIONAL ELECTIVE-II)

Course Outcomes: After Going Through This Course the Student Will

1. To know the basic concepts of Sensor Networks
2. To understand the concept of Deployment and Configuration
3. To know Routing Protocals
4. To understand the concept of Transport Layer And Security Protocols
5. To know Data storage & Manipulations

Unit-I

Introduction: Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks, Applications of Sensor Networks, Mobile AdhocNETworks (MANETs) and Wireless Sensor Networks, Enabling technologies for Wireless Sensor Networks,Sensor Node Hardware and Network Architecture: Single-node architecture, Hardware components & design constraints, Operating systems and execution environments, introduction to TinyOS and nesC, Network architecture, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts.

Unit-II

Deployment and Configuration: Localization and positioning, Coverage and connectivity, Single-hop and multi hop localization, self configuring localization systems, sensor management Network Protocols: Issues in designing MAC protocol for WSNs, Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and Zig Bee, Dissemination protocol for large sensor network.

UNIT-III

ROUTING PROTOCOLS: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols, Proactive Routing.

UNIT-IV

TRANSPORT LAYER AND SECURITY PROTOCOLS: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks

Unit-V

Data Storage and Manipulation: Data centric and content based routing, storage and retrieval in network, compression technologies for WSN, Data aggregation technique. Applications: Detecting unauthorized activity using a sensor network, WSN for Habitat Monitoring.

TEXT BOOKS

1. Holger Kerl, Andreas Willig, ―Protocols and Architectures for Wireless Sensor Network‖, John Wiley and Sons, 2005 (ISBN: 978-0-470-09511-9)
2. Raghavendra, Cauligi S, Sivalingam, Krishna M., ZantiTaieb, ―Wireless Sensor Network‖, Springer 1st Ed. 2004 (ISBN: 978-4020-7883-5).

REFERENCE

1. Kazem, Sohraby, Daniel Minoli, TaiebZanti, -Wireless Sensor Network: Technology, Protocols and Application‖, John Wiley and Sons 1st Ed., 2007 (ISBN: 978-0-471-74300-2).
2. B. Krishnamachari, ― Networking Wireless Sensors‖, Cambridge University Press.

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T04-RADAR ENGINEERING
(Professional Elective II)

OBJECTIVES

The student will be introduced to:

1. The Basic Principle of radar and radar range equation.
2. Different types of radars; CW, FM-CW, MTI and pulse Doppler radars.
3. Understand the different tracking techniques for radar.
4. Understand the characteristics of a matched filter receiver and its performance.
5. Understand the different types of displays, duplexers and antennas used in radar systems.

OUTCOMES

After going through this course the student will be able to:

1. Derive the radar range equation and to solve some analytical problems.
2. Understand the different types of radars and its applications.
3. Understand the concept of tracking and different tracking techniques.
4. Understand the various components of radar receiver and its performance
5. Analyze different types of displays, duplexers and antennas used in radar systems.

UNIT–I:Basics of Radar

Introduction, Maximum Unambiguous Range, simple Radar range Equation, Radar BlockDiagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, MinimumDetectable Signal, Receiver Noise, Illustrative Problems.

Radar Equation: Modified Radar Range Equation, SNR, and probability of detection, probability of False Alarm,Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere),Transmitter Power, PRF and Range Ambiguities, Illustrative Problems.

UNIT–II:CW and Frequency Modulated Radar

Doppler Effect, CW Radar – Block Diagram, Isolation betweenTransmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar.Illustrative Problems

FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics.

UNIT-III:MTI and Pulse Doppler radar

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter andPower Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar block diagram, Parameters, Limitations to MTIPerformance.

UNIT –IV:

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking Radar – AmplitudeComparison Mono pulse, Phase Comparison Mono pulse, tracking in Range,Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT –V:

Radar Receivers –Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers.Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Widthchanges, Series versus parallel feeds, Applications, Advantages and Limitations.

TEXT BOOKS:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Ed., 2007.
2. Principles of Modern Radar: Basic Principles: Mark A. Richards, James A. Scheer, William A

REFERENCE BOOKS:

1. Introduction to Radar Systems, 3rd edition – M.I. Skolnik, TMH Ed., 2005
2. Radar: Principles, Technology, Applications – Byron Edde, Pearson Education, 2004..

B. Tech VII Semester

L	T	P	C
3	0	0	3

18EC7T05-EMBEDDED STSTEMS
(Professional Elective II)

OBJECTIVES:

1.Technology capabilities and limitations of the hardware, software components
2.Methods to evaluate design tradeoffs between different technology choices.
3.Design Methodologies

OUTCOMES:

Understand the basics of an embedded system
1.Program an embedded system
2.Design, implement and test an embedded system.
3.Identify the unique characteristics of real-time systems
4.Explain the general structure of a real-time system
5.Define the unique design problems and challenges of real-time systems

SYLLABUS

UNIT-I:

Introduction to Embedded systems:What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples

UNIT-II:

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher‘s problem.

UNIT-IV:

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V:

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.
2. Embedded Systems: A Contemporary Design Tool Paperback by James K. Peckol

REFERENCE BOOKS:

1.Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2.Embedded Systems, Rajkamal, TMH, 2009.

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T06-SATELLITE COMMUNICATION
(Professional Elective III)

COURSE OBJECTIVES
The student will be introduced to:
1. Understand the concepts, applications and subsystems of Satellite communications.
2. Derive the expression for G/T ratio and to solve some analytical problems on satellite link design
3. Understand the concepts of satellite navigation, architecture and applications of GPS.

COURSE OUTCOMES
At the end of this course the student can able to:
1. Understand the basic concepts, applications, frequencies used and types of satellite communications.
2. Understand the concept of look angles, launches and launch vehicles and orbital effects in satellite Communications.
3. Understand the various satellite subsystems and its functionality.
4. Understand the concepts of satellite link design and calculation of C/N ratio.
5. Understand the concepts of multiple access and various types of multiple access techniques in satellite Systems.

UNIT I
INTRODUCTION: Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications.
ORBITAL MECHANICS AND LAUNCHERS: Orbital Mechanics, Look Angle determination, Orbital perturbations, orbital elements, launches and launch vehicles, Orbital effects in communication systems performance. **UNIT II**
SATELLITE SUBSYSTEMS: Attitude and orbit control system, telemetry, tracking, Command and Monitoring, power systems, communication subsystems, Satellite antenna, Equipment reliability and Space qualification.
UNIT III
SATELLITE LINK DESIGN: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.
UNIT IV
MULTIPLE ACCESS: Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA, DAMA, Code Division Multiple access (CDMA), Spread spectrum transmission and reception.
UNIT V
SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM: Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPSNavigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.
TEXT BOOKS:
1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.
REFERENCES:
1. Satellite Communications: Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T07- CONSUMER ELECTRONICS
(Professional Elective III)

COURSE OUTCOMES:

Upon the completion of this course, students will demonstrate the ability to:

1. Understand electronics engineering concepts used in consumer electronics systems.
2. Identify the need of preventive maintenance in various electronic appliances.
3. Use different product safety, compliance standards and techniques associated with electronic products.
4. Evaluate and analyze different electronic products and systems based on specifications.
5. Manage multi-faceted and multi-disciplinary projects with significant technical considerations using a broad systems perspective.

UNIT I

AUDIOSYSTEM: Microphones,loudspeakersbaffleandenclosure,Acoustics,mono,stereo,Quad,Amplifying System,EqualizersandMixersSynthesizers,CommercialSound,TheaterSoundSystem.

UNIT II

VIDEOSYSTEMSANDDISPLAYS: Monochrome, Color TV standards, TFT, Plasma, HDTV, LCD, LED TV, Direct-To-Home (DTH-Set Top Box),Video Telephoneand Video Conferencing.

UNIT III

DOMESTIC & CONSUMER APPLIANCES: Washing machines, Microwave ovens, Air-conditioners and Refrigerators, Computers office System, Telephone & Mobile Radio System.

UNIT IV

POWERSUPPLIES:SMPS/UPSandPreventiveMaintenanceandotherssystemssuchasRemotecontrols,Bar codes, RFID

UNIT V

PRODUCTCOMPLIANCE: Product safety and liability issues; standards related to electrical safety and fire hazards, EMI/EMC requirements, design techniques for ESD, RF interference and immunity, line current harmonics and mains voltage surge.

TEXTBOOKS:

1. Consumer Electronics ;SP Bali; Pearson Education.
2. Consumer Electronics ;J.S. Chitode; Technical Publications, Pune.

Reference Books:

1.Consumer Electronics by B.R. Gupta, Revised Edition
2. Consumer Electronics Paperback – 1 January 2013 by B.R. Gupta (Author), V. Singhal (Author)

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T08-OPTICAL COMMUNICATION
(Professional Elective III)

OUTCOMES:
Upon the completion of this course, students will demonstrate the ability to:

1. Understand about the various optical fiber modes, configuration and transmission characteristics of optical fibers
2. Learn about the various optical sources, detectors and transmission techniques
3. Explore various idea about optical fiber measurements and various coupling techniques
4. Enrich the knowledge about optical communication systems and networks
5. Design optical system based on requirements.

UNIT I:INTRODUCTION TO OPTICAL FIBERS
Introduction to optical fiber communication system and advantages, Ray theory of transmission, total internal reflection, Acceptance Angle, Numerical Aperture, Skew Rays, Optical Fiber waveguide- Modes, Vnumber, Mode Coupling, Step Index Fibers, Graded Index Fibers. Single Mode Fibers- Cut off Wavelength, Mode Field Diameter, Effective Refractive Index

UNIT II: TRANSMISSION CHARACTERISTIC AND DISTORTION
Fiber Materials,Signal Distortion in Optical Fibers: Attenuation, Absorption, Scattering and Bending Losses, Core and Cladding Losses, Types of Dispersion – Material Dispersion, Wave- Guide Dispersion, Polarization Mode Dispersion, Intermodal Dispersion, Pulse Broadening, Optical Fiber Connectors- Connector Types, Connector Return Loss.Fiber Splicing: Splicing Techniques, Fiber Alignment and Joint Loss

UNIT III: OPTICAL SOURCES AND DETECTORS
Optical Sources- LEDs, Structures, Materials, surface emitting LED, Edge emitting LED, quantum efficiency, Power, Modulation, Power Bandwidth Product, Injection Laser Diodes- Modes, Threshold Conditions, External Quantum Efficiency, Laser Diode Rate Equations, Detectors: PIN photo detector and Avalanche photo diodes

UNIT IV: POWER LAUNCHING AND RECEPTION
Source to Fiber Power Launching: – Output Patterns, Power Coupling, Power Launching, Equilibrium Numerical Aperture, Laser Diode to Fiber Coupling, optical receiver operation, digital signal transmissionerror sources, digital receiver performance-probability of error-receiver sensitivity-quantum limit.

UNIT V: OPTICAL SYSTEM DESIGN
Optical System design consideration-Point to Point link design, Link power budget, rise time budget, WDM principles and necessity, Measurement of Attenuation and Dispersion, Eye pattern

TEXT BOOKS
1. Optical Fiber Communications — Gerd Keiser, TMH, 4th Edition, 2008.
2. Optical Fiber Communications — John M. Senior, Pearson Education, 3rd Edition, 2009.

REFERENCE BOOKS
1. Fiber Optic Communications — D.K. Mynbaev, S.C. Gupta and Lowell L. Schemer, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications — S.C.Gupta, PHI, 2005.

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T09-Computer Architecture & Organization

(OPEN ELECTIVE-III)

OBJECTIVES:

1. Understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.
2. In addition to this the memory management system of computer.

Course outcomes: After Going Through This Course the Student Will

1. To know the Basic Structure of computers
2. To know the Register Transfer Language And Micro operations
3. To understand the memory concepts
4. To know the memory systems
5. To understand the concept of input output organization

UNIT-I

BASIC STRUCTURE OF COMPUTERS: The history of Computer development, Computer Types, Functional units, Basic operational concepts, Bus structures, System Software, Performance,Data types, Complements, Data Representation. Fixed Point Representation. Decimal Arithmetic operations Floating – Point Representation.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language. Register Transfer, Bus and memory transfer, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle. Memory
– Reference Instructions. Input – Output and Interrupt.

UNIT-III

CENTRAL PROCESSING UNIT: Stack Organization. Instruction formats. Addressing modes. Data Transfer and manipulation. Program control.

MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, Design of control unit-Hard wired control. Micro programmed control

UNIT-IV

THE MEMORY SYSTEM: Memory Hierarchy, Main Memory- RAM, ROM, PROM, EPROM, EEPROM , Flash Memory, Associative memory, Cache Memories: Mapping Functions, Virtual memory, Auxiliary memory, Secondary Storage: Magnetic Hard Discs, Optical Disks, Memory management hardware.

UNIT -V

INPUT-OUTPUT ORGANIZATION : Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB).

TEXT BOOKS:

1. Computer System Architecture – M.Moris Mano, IIIrd Edition, PHI / Pearson, 2006.
2. Computer Architecture and Organization – John P. Hayes, Mc Graw Hill International editions, 1998.

REFERENCES:

1. Computer Organization and Architecture – William Stallings 7th Edition, PHI/Pearson, 2006.
2. Computer Organization – Car Hamacher, ZvonksVranesic, SafwatZaky, 5th Edition, McGraw Hill, 2002

B. Tech VII Semester	L	T	P	C
	3	0	0	3

18EC7T10-BIO MEDICAL ENGINEERING

(OPEN ELECTIVE-III)

COURSE OBJECTIVES

1. To introduce student to basic biomedical engineeringtechnology
2. To understand the anatomy & physiology of major systems of the body in designing equipment for medicaltreatments.
3. To impart knowledge about the principle and working of different types of bio-medical electronic equipment/devices.

COURSE- OUTCOMES: After Going Through This Course the Student Will

1. To understand diagnosis and therapy relatedequipments.
2. To understand the problem and identify the necessity of equipment for diagnosis and therapy.
3. To understand the importance of electronics engineering in medicalfield.
4. To understand the importance of telemetry in patientcare
5. To know the Diagnostic Techniques

UNIT-1:

INTRODUCTION TO BIOMEDICAL INSTRUMENTATION:Age of Biomedical Engineering, Development of Biomedical Instrumentation, Man Instrumentation System, Components of the Man-Instrument System, Physiological System of the Body, Problems Encountered in Measuring a Living System, Sources of Bioelectric Potentials, Muscle, Bioelectric Potentials, Sources of Bioelectric Potentials, Resting and Action Potentials, Propagation of Action Potential, Bioelectric Potentials-ECG, EEG and EMG, Envoked Responses.

UNIT-II:

ELECTRODES AND TRANSDUCERS: Introduction, Electrode Theory, Biopotential Electrodes, Examples of Electrodes, Basic Transducer Principles, Biochemical Transducers, The Transducer and Transduction Principles, Active Transducers, Passive Transducers, Transducers for Biomedical Applications, Pulse Sensors, Respiration Sensor, Transducers with Digital Output.

UNIT-III:

CARDIOVASCULAR SYSTEM AND MEASUREMENTS: The Heart and Cardiovascular System, Electro Cardiography, Blood Pressure Measurement, Measurement of Blood Flow and Cardiac Output, Measurement of Heart Sound, Plethysmography.

MEASUREMENTS IN THE RESPIRATORY SYSTEM: The Physiology of The Respiratory System, Tests and Instrumentation for The Mechanics of Breathing, Respiratory Therapy Equipment.

UNIT-IV:

PATIENT CARE AND MONITORING: Elements of Intensive-Care Monitoring, Patient Monitoring Displays, Diagnosis, Calibration and Repair ability of Patient-Monitoring Equipment, Other Instrumentation for Monitoring Patients, Organization of the Hospital for Patient-Care Monitoring, Pacemakers, Defibrillators, Radio Frequency Applications of Therapeutic use.

THERAPEUTIC AND PROSTHETIC DEVICES: Audiometers and Hearing Aids, Laparoscope, Shock Hazards and Prevention, Physiological Effects and Electrical Current, Shock Hazards from Electrical Equipment, Methods of Accident Prevention,

UNIT-V:

DIAGNOSTIC TECHNIQUES AND BIO-TELEMETRY: Principles of Ultrasonic Measurement, Ultrasonic Imaging, Ultrasonic Applications of Therapeutic Uses, Ultrasonic Diagnosis, X-Ray and Radio-Isotope Instrumentations, CAT Scan, Emission Computerized Tomography, MRI, Introduction to Biotelemetry, Physiological Parameters Adaptable to Biotelemetry, The Components of Biotelemetry System, Implantable Units, Telemetry for ECG Measurements during Exercise, Telemetry for Emergency Patient Monitoring.

Text Books:

1. Bio-Medical Electronics and Instrumentation‖, Onkar N. Pandey, Rakesh Kumar, Katson Books.
2. Bio-Medical Instrumentation‖, Cromwell , Wiebell, Pfeiffer

References

1. Introduction to Bio-Medical Equipment Technology‖, 4th Edition, Joseph J. Carr, John M. Brown, Pearson Publications.
2. Hand Book of Bio-Medical Instrumentation‖, Instrumentation‖, Kandahar. McGraw-Hill

B. Tech VII Semester

L	T	P	C
3	0	0	3

18EC7T11-NANO ELECTRONICS

(OPEN ELECTIVE-III)

COURSE OBJECTIVE: This course is intended to cover basics of electronics, transistor, band structure models, nanocapacitors, coulomb blockade, single electron transistor and nanophotonics.

COURSE OUTCOME of the study: After Going Through This Course the Student Will

1. To know nanoelectronics holds the capacity for mass production of high-quality nanodevices with an enormous variety of applications from computers to biosensors, from cell phone to space shuttles and from large display screens to small electronic toys.
2. To know the scaling of transistors and other devices to smaller and smaller sizes, which has provided the basis for this exponential growth, has limits, physical (size of the atoms), technological (lithography) and economic, which will be reached by nanoelectronics in the next coming decade.
3. To understand the materials of nanoelectronics
4. To know Ballistic and Diffusive Transport
5. To understand the concept of quantum dots

UNIT-I

Basics of nano linear optics and electronics**.**Free Electron Theory & The New Ohm‘s Law: Why Electrons flow, Classical free electron theory, Sommerfeld's theory, The quantum of conductance, Coulomb blockade, Towards Ohm‘s law. The Elastic Resistor: Conductance of an Elastic Resistor, Elastic Resistor- Heat dissipation.

Unit-II:

Materials for nanoelectronics: Semiconductors, Crystal lattices: bonding in crystals, Electron energy bands, Semiconductor heterostructures , Lattice-matched and pseudomorphicheterostructures Inorganic nanowires, Organic semiconductors , Carbon nanomaterials: nanotubes and fullerenes

UNIT-III:

Ballistic and Diffusive Transport: Ballistic and Diffusive Transfer Times, Channels for Conduction Conductivity, Conductivity: E(p) or E(k) Relations, Counting States, Drude Formula, Quantized Conductance, Electron Density - Conductivity

Unit-IV:

Electron transport in semiconductors and nanostructures Time and length scales of the electrons in solids, Statistics of the electrons in solids and nanostructures, Fermi statistics for electrons, the density of states of electrons in nanostructures, Electron transport in nanostructures.

Unit - V:

Electrons in traditional low-dimensional structures Electrons in quantum wells: Single modulation-doped heterojunctions, Numerical analysis of a single heterojunction, Control of charge transfer, Electrons in quantum wires, Electron transport in quantum wires, Electrons in quantum dots .

TEXT BOOK:

1. Introduction to Nano Science and Technology by S.M. Lindsay.
2. Supriyo Dutta -Lessons from Nanoscience: A Lecture Note Series, World Scientific (2012).

REFERENCE

1. Michael Wilson, KamaliKannangara, Geoff Smith, Michelle Simmons and Burkhard
2. Raguse, Nanotechnology: Basic Science and Emerging Technologies, Chapman & Hall / CRC, 2002

B. Tech VII Semester	L	T	P	C
	1	0	2	2

18EC6L12-MICROWAVE & OC LAB

COURSE OUTCOMES

1. The student will be able to understand the characteristic of Optical fiber.
2. The student will be able to Differentiate analog and digital link.
3. The student will be able to Measure the power and attenuation of optical and microwave devices.
4. The student will be able to Microwave parameter measurement of Gunn diode and Reflex Klystron.
5. Able to determine numerical aperture and attenuation of optical fiber.

INTRODUCTION:

This lab is offered to B.Tech. ECE students and concentrates on introducing the advances in communications. This lab is well equipped with all the microwave devices. The Laboratory conducts practical sessions to enable the students to implement their theoretical knowledge and observe the practical results, following outcome based education.

Lab deals with the measurements of the signals at micro frequency range. It involves measurement of frequency, wave length, VSWR, Impedance and scattering parameters of various micro wave devices like Circulator, Direction Coupler, and Magic-Tee. Even the latest trend of communication technology i.e., fiber optics is also introduced and propagation conditions will be verified by evaluating the losses.

LIST OF EXPERIMENTS

MICROWAVE EXPERIMENTS

1. Basic microwave parameter measurement such as Frequency, wavelength, Attenuation, Power, VSWR, and Impedance.
2. Reflex klystron characteristics.
3. GUNN diode characteristics.
4. S - parameter Measurement of the following microwave components.
Isolator, Circulator, Directional Coupler, E plane Tee, H plane Tee,
Magic Tee.
5. Radiation Pattern of Horn Antenna.

OPTICAL EXPERIMENTS

1. DC Characteristics of LED, LASER and PIN Photo diode.
2. Mode Characteristics of Fibers.
3. Measurement of connector and bending losses.
4. Fiber optic Analog and Digital Link – frequency response(analog) and eye diagram(digital).
5. Numerical Aperture determination for Fibers.
6. Attenuation Measurement in Fibers.

B. Tech VII Semester	L	T	P	C
	0	0	2	2

18EC7P13-INDUSTRIAL INTERNSHIP

The students are required take internship at reputed industries to design and develop prototype model relevant to the Electronics and Communication. The internship should be done by individual student. The internship should done either at industry or in institute in connection with industry; student should give presentation and demonstration of internship. The students are required to submit document of internship report at the end.

COURSE OUTCOMES:

After going through this the student will be able to

- Understand the real world problems
- Aquitaine with industry interaction skills
- Gain knowledge to solve and address the problem
- Improve presentation skills and writing skills
- Involve in industrial needs related work

The evaluation is done based on

1. Industry Interaction by student
2. Complexity of problems understand at industry
3. Activities taken place at Industry
4. Any Design and Development in work
5. Presentation and Communication skill of student
6. Report given by the Student

SEMESTER- VIII

SYLLABUS

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T01-CODING THEORY and TECHNIQUES

COURSE OBJECTIVES:

1. Introduce The Principles and Applications of Information Theory.
2. To Teach Study How Information Is Measured in Terms of Probability and Entropy, And The Relationships Among Conditional and Joint Entropies.
3. To Teach Coding Schemes, Including Error Correcting Codes.
4. Explain How This Quantitative Measure of Information May Be Used in Order to Build Efficient Solutions to Multitudinous Engineering Problems.

COURSE OUTCOMES:

After completion of the course, the student is able to

CO1: Design the channel performance using Information theory.
CO2: Comprehend various error control code properties
CO3: Apply linear block codes for error detection and correction
CO4: Apply convolution codes for performance analysis & cyclic codes for error detection and correction.
CO5: Design BCH & RS codes for Channel performance improvement against burst errors.

Unit-I

Information Theory: Introduction, Measure of information, Information content of message, Average Information content of symbols in Long Independent sequences, Average Information content of symbols in Long dependent sequences, Statistical Model of Information Sources, Entropy and Information rate

Unit-II

Source Coding: Source coding theorem, Prefix Codes, Kraft McMillan Inequality Property Encoding of the Source Output, Shannon‘s Encoding Algorithm. Shannon Fano Encoding Algorithm, Huffman codes, Extended Huffman coding, Arithmetic Coding,

UNIT-III

Information Channels: Communication Channels, Channel Models, Channel Matrix, Joint probability Matrix, Binary Symmetric Channel, System Entropies, Mutual Information, Channel Capacity, Channel Capacity of: Binary Symmetric Channel.

UNIT-IV

Error Control Coding: Introduction, Examples of Error control coding, methods of Controlling Errors, Types of Errors, types of Codes, Linear Block Codes: matrix description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes, Single Error Correcting Hamming Codes, Table lookup Decoding using Standard Array. Binary Cyclic Codes: Algebraic Structure of Cyclic Codes, Encoding using an (n-k) Bit Shift register, Syndrome Calculation, Error Detection and Correction

UNIT-V

Some Important Cyclic Codes: Golay Codes, BCH Codes Convolution Codes: Convolution Encoder, Time

domain approach, Transform domain approach, Code Tree, Trellis and State Diagram, The Viterbi Algorithm)

Text, References &

Software Textbook:

1. Information Theory, Inference and Learning Algorithms by David J.C. MacKay. Draft 2.2.4 August 31, 2001.
2. Man Young Rhee, "Error Correcting Coding Theory", 1989, McGraw-Hill Man Young Rhee, "Error Correcting Coding Theory", 1989, McGraw-Hill

Reference book:

1. Elements of Information Theory, by Thomas M. Cover and Joy A. Thomas, John Wiley, 1991, ISBN 0-471- 06259-6
2. Todd K.Moon, "Error Correction Coding – Mathematical Methods and Algorithms", 2006, Wiley India

Software:

MATLAB or Mathcad and access to a C++

compiler **Internet Resources:**

http://www.inference.phy.cam.ac.uk/mackay/itp

rnn/

http://www.math.psu.edu/gunesch/entropy.htm

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T02-SPREAD SPECTRUM COMMUNICATIONS

(Professional Elective – IV)

Course Objectives:

The objectives of this course are to make the student

1. Understand the concept of Spread Spectrum and study various types of Spread spectrum sequences and their generation.
2. Understand the principles of Code Division Multiple Access (CDMA) and use of Spread spectrum concept in CDMA
3. Understand various Code tracing loops for optimum tracking of wideband signals viz spread spectrum signals.
4. Understand the procedure for synchronization of receiver for receiving the Spread spectrum signal.

Course Outcomes:

On completion of this course student will be able to

1. Generate various types of Spread spectrum sequences and can simulate CDMA system (Both Transmitter & Receiver).
2. Analyze the performance of Spread spectrum systems in Jamming environment and systems with Forward Error Correction.
3. Can provide detection and cancellation schemes for Multiuser in CDMA cellular radio.
4. Understand various Code tracing loops for optimum tracking of wideband signals viz spread spectrum signals.
5. Understand the procedure for synchronization of receiver for receiving the Spread spectrum signal

UNIT - I

Introduction to Spread Spectrum Systems: Fundamental Concepts of Spread Spectrum Systems, Pseudo Noise Sequences, Direct Sequence Spread Spectrum, Frequency Hop Spread Spectrum, Hybrid Direct Sequence Frequency Hop Spread Spectrum, Code Division Multiple Access. Binary Shift Register Sequences for Spread Spectrum Systems: Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

UNIT - II

Code Tracking Loops: Introduction, Optimum Tracking of Wideband Signals, Base Band Delay-Lock Tracking Loop, Tau-Dither Non- Coherent Tracking Loop, Double Dither NonCoherent Tracking Loop.

UNIT - III

Initial Synchronization of the Receiver Spreading Code: Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

UNIT - IV

Cellular Code Division Multiple Access (CDMA) Principles: Introduction, Wide Band Mobile Channel,

The Cellular CDMA System, Single User Receiver in a Multi User Channel, CDMA System Capacity. Multi-User Detection in CDMA Cellular Radio: Optimal Multi-User Detection, Linear Suboptimal Detectors, Interference Combat Detection Schemes, Interference Cancellation Techniques.

UNIT - V

Performance of Spread Spectrum Systems in Jamming Environments: Spread Spectrum Communication System Model, Performance of Spread Spectrum Systems without Coding. Performance of Spread Spectrum Systems with Forward Error Correction: Elementary Block Coding Concepts, Optimum Decoding Rule, Calculation of Error Probability, Elementary Convolution Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

TEXT BOOKS:

1. Rodger E Ziemer, Roger L. Peterson and David E Borth - –Introduction to Spread Spectrum Communication- Pearson, 1st Edition, 1995.

2. Mosa Ali Abu-Rgheff – ―Introduction to CDMA Wireless Communications.‖ Elsevier Publications, 2008.

REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem - ―Modern Communication and Spread Spectrum,‖ McGraw Hill, 1986.
2. Andrew j. Viterbi - ―CDMA: Principles of spread spectrum communication,‖ Pearson Education, 1st Edition, 1995

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T03-STATISTICAL SIGNAL PROCESSING
(Professional Elective – IV)

COURSE OBJECTIVES

1. Introduce graduate students to the mathematical ideas that form the basis for modern statistically-based analysis of signals and systems.
2. To study the mathematical background of signal detection and estimation.
3. To study and use classical and Bayesian approaches to formulate problems.
4. To study signal detection and parameter estimation from noisy signals.
5. To study filtering methods for parameter estimation.

COURSE OUTCOMES:

1. Generalize the properties of statistical models in the analysis of signals using Stochastic processes.
2. Differentiate the prominence of various spectral estimation techniques for Achieving higher resolution in the estimation of power spectral density.
3. Outline various parametric estimation methods to accomplish the signal modeling even at higher order statistics.
4. Design and development of optimum filters using classical and adaptive algorithms.
5. Extrapolate the importance of least squares techniques and decomposition methods in analyzing the signal estimations.

Unit-1:

Review of random variables: Distribution and density functions, moments, independent, uncorrelated and orthogonal random variables; Vector-space representation of Random variables, Schwarz Inequality Orthogonality principle in estimation, Central Limit theorem, Random processes, wide-sense stationary processes, autocorrelation and auto covariance functions, Spectral representation of random signals, Wiener Khinchin theorem Properties of power spectral density, Gaussian Process and White noise process. Random signal modeling: MA(q), AR(p) , ARMA(p, q) models.

Unit-II

Parameter Estimation: Theory Principle of estimation and applications, Properties of estimates, unbiased and consistent estimators, Minimum Variance Unbiased Estimates (MVUE), Cramer Rao bound, Efficient estimators; Criteria of estimation: the methods of maximum likelihood and its properties; Bayesian estimation: Mean square error and MMSE, Mean Absolute error, Hit and Miss cost function and MAP estimation.

Unit-III

Estimation of signal in presence of white Gaussian Noise: Linear Minimum Mean-Square Error (LMMSE) Filtering: Wiener Hoff Equation, FIR Wiener filter, Causal IIR Wiener filter, Noncausal IIR Wiener filter, Linear Prediction of Signals, Forward and Backward Predictions, Levinson Durbin Algorithm, Lattice filter realization of prediction error filters.

Unit-IV

Adaptive Filtering: Principle and Application, Steepest Descent Algorithm Convergence characteristics; LMS algorithm, convergence, excess mean square error, Leaky LMS algorithm; Application of Adaptive filters; RLS algorithm, derivation, Matrix inversion Lemma, Initialization, tracking of nonstationary.

Unit-V

Kalman filtering: State-space model and the optimal state estimation problem, discrete Kalman filter, continuous- time Kalman filter, extended Kalman filter.

TEXT BOOKS

1.Discrete Random Signals and Statistical Signal Processing, By Charles W. Therrien, Prentice Hall Signal Processing Series

REFERENCE TEXT BOOK

1.M. H. Hayes, Statistical Digital Signal Processing and Modeling, John Wiley & Sons, Inc.,

2.D.G. Manolakis, V.K. Ingle and S.M. Kogon: Statistical and Adaptive Signal Processing, McGraw Hill, 2000. 3.

SIMULATION TEXT BOOKS

1.Statistical Digital Signal Processing and Modeling by Monson Hayes, John Wiley & Sons, Inc.,

2.J. G. Proakis et. al., Algorithms for Statistical Signal Processing, Pearson Education, 2002.

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T04-Electronic Measurements & Instrumentation

(Professional Elective – IV)

COURSE OBJECTIVES

1. Explain basic concepts and definitions in measurement.
2. Describe the bridge configurations and their applications.
3. Elaborate discussion about the importance of signal generators and analyzers in Measurement.
4. To introduce monitor, analyze and control any physical system.
5. To understand how different types of meters‘ work and their construction

COURSE OUTCOMES:

1. Recognize the evolution and history of units and standards in Measurements.
2. Identify the various parameters that are measurable in electronic instrumentation.
3. Employ appropriate instruments to measure given sets of parameters.
4. Practice the construction of testing and measuring set up for electronic systems.
5. To have a deep understanding about instrumentation concepts which can be applied to Control systems.

UNIT I

Performance characteristics of instruments, Static characteristics- Accuracy, Resolution, Precision, Expected value, Error, Sensitivity, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. Errors in Measurement. DC Voltmeters- Multi range, Range extension, AC voltmeters- multi range, range extension, Thermocouple type RF ammeter, Ohmmeters series type, Mustimeter for Voltage, Current and resistance measurements.

UNIT II

Signal Generator- fixed and variable, AF oscillators, AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform Generators. Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

UNIT III

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, standard specifications of CRO, CRO probes- Active & Passive, Lissajous method of frequency measurement, Dual trace oscilloscope, Sampling oscilloscope, Storage oscilloscope, Digital Storage oscilloscope.

UNIT IV

Measurement of Resistance-Wheat stone bridge. Kelvin‘s bridge, Kelvin‘s Double bridge**,** AC Bridges Measurement of Inductance- Maxwell‘s bridge, Anderson bridge, Hay‘s bridge. Measurement of Capacitance -Schering Bridge. Wien Bridge, Errors and precautions in using AC bridges. Q-meter.

UNIT V

Data Acquisition Systems, Transducers- Types of transducers, Resistance, Capacitance, inductance, LVDT, Strain gauges, Piezo Electric transducers, Thermocouples, Thermistors, Sensistors. Measurement of physical parameters - force, pressure, velocity, humidity and displacement.

TEXTBOOKS:

1. Electronic Instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

REFERENCES :

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Edition, 2004.

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T05-Operating Systems

OPEN ELECTIVE IV

COURSE OBJECTIVES

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication
3. To learn the mechanisms involved in memory management in contemporary OS
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management

COURSE OUTCOMES:

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

1. Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.
2. Apply synchronization to cooperating processes and handle the deadlocks
3. Learn various management techniques for efficient utilization of system memory.
4. Understand and analyze theory and implementation of files and Evaluate different disk scheduling algorithms.
5. Analyze the functionalities in various operating systems.

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling- Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

UNIT-III:

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-IV:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT V:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management **Mass-storage structure** overview of Mass-storage structure, Disk scheduling, Device drivers **TEXT BOOKS:**

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education‖, 1996.

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T06-SOFT COMPUTING TECHNIQUES

OPEN ELECTIVE IV

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. Understand Soft Computing concepts, technologies, and applications.
4. Understand the underlying principle of soft computing with its usage in various application.
5. Understand different soft computing tools to solve real life problems.

COURSE OUTCOMES:

Upon completion of the course, the student is expected 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.

UNIT –I

Introduction: Approaches to intelligent control, Architecture for intelligent control, Symbolic reasoning system, Rule-based systems, the AI approach, and Knowledge representation - Expert systems.

UNIT –II

Artificial Neural Networks: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN, simple perceptron, Adaline and Madaline, Feed-forward Multilayer Perceptron, Learning and Training the neural network.

UNIT-III

Data Processing: Scaling, Fourier transformation, principal-component analysis and wavelet transformations, Hopfield network, Self-organizing network and Recurrent network, Neural Network based controller.

UNIT –IV

Fuzzy Logic System: Introduction to crisp sets and fuzzy sets, basic fuzzy set operation and approximate reasoning, Introduction to fuzzy logic modeling and control, Fuzzification, inferencing and defuzzification, Fuzzy knowledge

and rule bases, Fuzzy modeling and control schemes for nonlinear systems, Self-organizing fuzzy logic control, Fuzzy logic control for nonlinear time delay system.

UNIT –V

Genetic Algorithm: Basic concept of Genetic algorithm and detail algorithmic steps, Adjustment of free parameters, Solution of typical control problems using genetic algorithm, Concept on some other search techniques like Tabu search techniques for solving optimization problems, Applications.

TEXT BOOKS:

1. Introduction to Artificial Neural Systems - Jacek.M.Zurada, Jaico Publishing House, 1999.
2. Neural Networks and Fuzzy Systems - Kosko, B., Prentice-Hall of India Pvt. Ltd., 1994.

REFERENCE BOOKS:

1. Fuzzy Sets, Uncertainty and Information - Klir G.J. & Folger T.A., Prentice-Hall of India Pvt. Ltd.,
2. Fuzzy Set Theory and Its Applications - Zimmerman H.J. Kluwer Academic Publishers, 1994..

B. Tech VIII Semester	L	T	P	C
	3	0	0	3

18EC8T07- MECHATRONICS
OPEN ELECTIVE IV

COURSE OBJECTIVE The main objective of this course is to introduce the integrative nature of Mechatronics. To describe the basic programming, different components and devices of mechatronics systems**.**

COURSE OUTCOME:

Upon completion of this course, the students can able

1. Basic concepts of mechatronics
2. To design mechatronics system with the help of Microprocessor
3. To design PLC and other electrical and Electronics Circuits
4. To understand the concept of solid state Devices
5. To know Dynamic models & controllers

UNIT I

Introduction to Mechatronics – Systems – Concepts of Mechatronics approach – Need for Mechatronics – Emerging areas of Mechatronics – Classification of Mechatronics. Sensors and Transducers: Static and dynamic Characteristics of Sensor, Potentiometers – LVDT – Capacitance sensors – Strain gauges – Eddy current sensor – Hall effect sensor – Temperature sensors – Light sensors.

UNIT II

Introduction – Architecture of 8085 – Pin Configuration – Addressing Modes –Instruction set, Timing diagram of 8085 – Concepts of 8051 microcontrollers – Block diagram

UNIT III

Introduction – Basic structure – Input and output processing – Programming – Mnemonics – Timers, counters and internal relays – Data handling – Selection of PLC, Basic programming in PLC.

UNIT IV

Solid state electronic devices - PN junction diode, BJT, FET, DIAC, TRIAC and LEDs. Analog signal conditioning, operational amplifiers, noise reduction, filtering.

UNIT V

Dynamic models and analogies, System response. Process Controllers – Digital Controllers, Programmable Logic Controllers, Design of mechatronics systems & future trend.

TEXT BOOKS:

1. Bolton, –Mechatronics‖, Printice Hall, 2000

2. Ramesh S Gaonkar, –Microprocessor Architecture, Programming, and Applications with the 8085‖, 5th Edition, Prentice Hall, 2008.

REFERENCE BOOKS:

1. Mechatronics System Design / Devdas shetty/Richard/Thomson.

2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

B. Tech VIII Semester	L	T	P	C
	2	0	0	2

COURSE OBJECTIVES:

18EC8T08-DATA COMMUNICATION& NETWORKING
OPEN ELECTIVE-V

The objectives of this course are

1. To Focus on information sharing and networks.
2. To Introduce flow of data, categories of network, different topologies.
3. To Focus on different coding schemes.
4. Brief the students regarding protocols and standards.
5. To give clear idea of signals, transmission media, errors in data communications and their correction, networks classes and devices, etc.

COURSE OUTCOMES:

1. On successful completion of the course, the student will be having the basic knowledge of data sharing, transmission media and their protocols.
2. Student will have the basic knowledge of computer networks.
3. To Focus on information sharing and networks.
4. To Introduce flow of data, categories of network, different topologies.
5. To Focus on different coding schemes

UNIT-1

Introduction to data communication and networking: Why study data communication? Data Communication, Networks, Protocols and Standards, Standards Organizations. Line Configuration, Topology, Transmission Modes, Categories of Networks Internet works.

Study of OSI and TCP/IP protocol suit: The Model,Functions of the layers,TCP/IP Protocol Suites

UNIT-2

Study of Signals: Analog and Digital, Periodic and Aperiodic Signals, Analog Signals, Time and Frequency Domains, Composite Signals, Digital Signals.

Study of Digital transmission: Digital to Digital Conversion, Analog to Digital Conversion.

UNIT-3

Study of Analog transmission: Digital to Analog Conversion, Analog to Analog Conversion.

Study of Multiplexing: Many to one/one to Many, Frequency division Multiplexing, Wage division Multiplexing, Time division Multiplexing, Multiplexing applications.

UNIT-4

Types of transmission media: Guided Media, Unguided Media, Transmission Impairments, Performance Wavelength, Shannon Capacity, Media Comparison, PSTN, Switching.

Error Detection and Correction: Types of Errors, Detection, Parity Check, Vertical Redundancy Check Longitudinal Redundancy Check, Cyclic Redundancy Check, Checksum, Error Correction.

UNIT-5

Study of DTE-DCE in brief: Digital data transmission, DTE-DCE Interface, Modems, 56K Modems, Cable Modems.

Introduction to networks and devices: Network classes, Repeaters, Hub, Bridges, Switches, Routers, Gateways Routers, Routing Algorithms, Distance Vector Routing, Link State Routing.

Text Books:

1. Data communication & Networking by Bahrouz Forouzan.
2. Computer Networks by Andrew S. Tanenbaum

Reference Books:

1. Data and Computer Communications by William Stallings
2. Kleinrock, Leonard. *Queueing Systems, Vol 1: Theory*. New York, NY: Wiley J., 1975. ISBN: 0471491101.

B. Tech VIII Semeste	L	T	P	C
	2	0	0	2

18EC8T09- Renewable Energy sources

OPEN ELECTIVE-V

COURSE OBJECTIVE:

1. introduces basics of solar energy like solar radiation, collection, storage and application.
2. introduces the wind energy, biomass energy, geothermal energy and ocean energy

COURSE OUTCOMES:

1. Understand the basics of various renewable energy systems.
2. Understand the concepts of solar energy and wind energy.
3. Understand the concepts of bio-energy
4. Understand the concepts OTEC, geothermal and Ocean Energy
5. Understand the concepts of Ocean Energy

UNIT-I

Introduction: Introduction to energy sources, reserves and estimates, global energy scenario, renewable energy - environment implications, global warming and climate change, limitations of conventional energy sources, classification of non-conventional energy sources - solar energy, wind energy, bio-energy, *Ocean Thermal Energy Conversion* (OTEC), tidal, geothermal and hydro.

UNIT-II

Solar Radiation , Solar Energy Collection & Photovoltaic Energy Conversion

environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface,

instruments for measuring solar radiation and sun shine, solar radiation

data. Flat plate and concentrating collectors, classification of

concentrating collectors

Solar cell fundamentals, solar cell classification, performance of solar cell- power from solar module.

UNIT-III

Wind energy: Wind energy and its application, types of wind mills and their characteristics, elementary design principles, wind energy conversation system, determination of torque coefficient, wind energy storage -applications - hybrid (wind & solar)systems.

UNIT-IV

Bio-energy: Biomass and its sources, energy plantation, production of fuel wood, bio-conversion processes, bio-gas, bio-diesel and ethanol production and utilization, thermo-chemical processes, biomass gasification, process, types of reactors, utilization of producer gas for thermal and electricity generation.

UNIT-V

Ocean thermal energy conversion, geothermal and Ocean Energy

open and closed *Ocean thermal energy conversion* cycles, geothermal energy sources,. Tidal energy, wave energy, data, technology options; small hydro turbines, power plant and environmental issues

Text Books:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers, 2006
2. Renewable Energy resources, Tiwari and Ghosal, Narosa,2005

Reference Books:

1. Renewable Energy Technologies by R. Ramesh, K. Uday Kumar, M. Anandakrishnan, Narosa Publishing House, 1997
2. Non-Conventional Energy Systems by K Mittal, A. H. Wheeler Publishing Company Limited, 01-Jan-1999.

B. Tech VIII Semester	L	T	P	C
	2	0	0	2

18EC8T10-Network Security & Cryptography

OPEN ELECTIVE-V

COURSE OBJECTIVES:

The following principles and practice of cryptography and network security are covered:

1. Classical systems, symmetric block ciphers (DES, AES, other symmetric ciphers)
2. Public-key cryptography (RSA, discrete logarithms)
3. Algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes,
4. Email and web security
5. Security at the Transport Layer

COURSE OUTCOMES:

1. To be familiar with information security and a clear understanding of its importance.
2. To master protocols for security services
3. To be familiar with network security threats and countermeasures
4. To be familiar with network security designs using available secure solutions (such as PGP, SSL, IPSec, etc)
5. To be familiar with Security at the Transport Layer

UNIT- I:

Introduction: Security Goals, Cryptographic Attacks, Services and Mechanisms Cipher Model, Substitution Techniques, Transportation Techniques.

UNIT- II:

Symmetric Key Cryptography: Traditional Block Cipher Structure, DES algorithm, AES algorithm, Other Ciphers- Blowfish, IDEA, Block Cipher Modes of Operations

UNIT- III:

Asymmetric Key Cryptography: Public Key Cryptography: Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, and Elliptic Curve Cryptography

UNIT- IV:

Data Integrity, Digital Signature Schemes & Key Management : Message Integrity and Message Authentication, Cryptographic Hash Functions, Digital Signature.

Security at application layer: PGP and S/MIME,

UNIT -V: Security at the Transport Layer: SSL and TLS **Security at the Network Layer:** IPSec

TEXT BOOKS:

1) Cryptography and Network Security, Behrouz A Forouzan, DebdeepMukhopadhyay, (3e), Mc Graw Hill.

2) Cryptography and Network Security, William Stallings, (6e) Pearson.

REFERENCE BOOKS:

1) Network Security and Cryptography, Bernard Meneges, Cengage Learning.

2) Everyday Cryptography, Keith M.Martin, Oxford.

B. Tech VIII Semester	L	T	P	C
	0	0	16	8

18EC8P11-PROJECTS

A student is required to undertake a project work by using the knowledge acquired by him/her during the course of study. The student is expected to design and build a complete system or sub-system on an area of interest. A project work shall be carried out by a batch of students not exceeding 5 members, under a faculty supervisor.

i. **Continuous Internal Evaluation:** For Major Project, there shall be continuous internal evaluation during the semester for 30 marks. The continuous internal evaluation for the Major Project shall be on the basis of day to day assessment by the supervisor and two reviews conducted by the Project Review Committee (PRC). The PRC consists of Head of the Department, Program Coordinator and two Senior Faculty members of department. The distribution of marks is given in the table below:

Table 6: Distribution of Marks (CIE)

S. No.	Criteria	Marks
1	Day to Day Assessment	10
2	Review-1	10
3	Review-2	10

ii. **Semester-end Examination:** A batch of students shall submit a duly-certified Project Report to the department on a specified time. They shall make a presentation on the Project work before a three-member committee consisting of External Examiner, Internal Examiner (HOD) and the Project Supervisor

B. Tech VIII Semester	L	T	P	C
	0	0	0	0

18EC8L12-Comprehensive Viva-Voice

A student is required to undertake Comprehensive Viva-Voice To enhance knowledge acquired by him/her during the course of study. The student is expected to present his knowledge in the field of Electronics and communication Engineering and build a complete interest in course. A Comprehensive Viva-Voice shall be carried out by a individual student. They shall attend before a three-member committee consisting of Head of the Department and Two Senior Faculty members Also the Supervisor

ELECTRICAL & ELECTRONICS ENGINEERING
COURSE STRUCTURE
B. TECH I SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE1T01	HSMC	English - I	2	-	-	2	2
2	18EE1T02	BSC	Linear algebra and differential equations	3	1	-	4	4
3	18EE1T03	BSC	Applied Chemistry	3	-	-	3	3
4	18EE1T04	ESC	Problem Solving Approaches through C	3	-	-	3	3
5	18EE1T05	ESC	Engineering Graphics	3	-	-	3	3
6	18EE1L06	HSMC	English Communication Skills Lab-I	-	-	2	2	1
7	18EE1L07	BSC	Applied chemistry Lab	-	-	3	3	1.5
8	18EE1L08	ESC	Problem Solving Approaches through C Lab	-	-	3	3	1.5
9	18EE1L09	ESC	Field Practice Lab	-	-	2	2	1
						Total number of credits		**20**

B. TECH II SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE2T01	HSMC	English – II	2	-	-	2	2
2	18EE2T02	BSC	Vector Calculus and Fourier Transforms	**3**	-	-	3	3
3	18EE2T03	BSC	Applied Physics	3	-	-	3	3
4	18EE2T04	BSC	Biology For Engineers	2	-	-	2	2
5	18EE2T05	PCC	Power Systems –I	3	-	-	3	3
6	18EE2T06	ESC	Electrical Circuit Analysis – I	4	-	-	4	4
7	18EE2L07	BSC	Applied Physics Lab	-	-	3	3	1.5
8	18EE2L08	ESC	Basic Engineering & IT Workshop	-	-	3	3	1.5
9	18EE2T09	MC	Environmental Science	2	-	-	2	-
						Total number of credits		**20**

B. TECH III SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE3T01	BSC	Complex Variables and Numerical Methods	3	-	-	3	3
2	18EE3T02	PCC	Electrical Circuit Analysis – II	3	1	-	4	4
3	18EE3T03	PCC	Analog Electronics-I	3	-	-	3	3
4	18EE3T04	PCC	Electrical Machines – I	3	-	-	3	3
5	18EE3T05	PCC	Electromagnetic Fields	3	-	-	3	3
6	18EE3T06	ESC	Basics of Mechanical Engineering	3	-	-	3	3
7	18EE3L07	PCC	Electrical Circuits Lab	-	-	3	3	1.5
8	18EE3L08	PCC	Analog Electronics Lab	-	-	3	3	1.5
9	18EE3T09	MC	Education Technology and Society	2	-	-	2	-
							Total number of credits	**22**

B. Tech IV Semester

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE4T01	PCC	Analog Electronics-II	3	-	-	3	3
2	18EE4T02	PCC	Electrical Machines – II	3	-	-	3	3
3	18EE4T03	PCC	Control Systems	3		-	3	3
4	18EE4T04	PCC	Power Systems –II	3	-	-	3	3
5	18EE4T05	PCC	Digital Electronics	3	-	-	3	3
6	18EE4T06	ESC	Data Structures Through C	3	-	-	3	3
7	18EE4L07	PCC	Control Systems & Simulation Lab	-	-	3	3	1.5
8	18EE4L08	PCC	Electrical Machines – I Lab	-	-	3	3	1.5
9	18EE4L09	ESC	Data Structures Through C Lab	-	-	2	2	1
							Total number of credits	**22**

B. Tech V SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE5T01	PCC	Power Electronics	3	-	-	3	3
2	18EE5T02	PCC	Electrical Measurements	3	-	-	3	3
3	18EE5T03	ESC	Python Programing	3	-	-	3	3
4	18EE5T04	HSMC	Effective Technical Communication	3	-	-	3	3
5	**Open Elective – I**			3	-	-	3	3
6	18EE5L08	PCC	Electrical Machines – II Lab	-	-	3	3	1.5
7	18EE5L09	PCC	Electrical Measurements Lab	-	-	3	3	1.5
8	18EE5L10	ESC	Python Programing Lab	2	-	-	2	1
9	18EE5T11	MC	Constitution of India	2	-	-	2	-
Total number of credits								**19**

B. Tech VI SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE6T01	PCC	Microprocessors and Micro controllers	3	-	-	3	3
2	18EE6T02	PCC	Switchgear and Protection	3	-	-	3	3
3	18EE6T03	ESC	OOPS through JAVA	3	-	-	3	3
4	18EE6T04	HSMC	Management Science	3	-	-	3	3
5	**Open Elective – II**			3	-	-	3	3
6	18EE6L07	PCC	Microprocessors and Micro Controllers Lab	-	-	3	3	1.5
7	18EE6L08	PCC	Power Electronics & Simulation Lab	-	-	3	3	1.5
8	18EE6L09	ESC	OOPS through JAVA Lab	2	-	-	2	1
Total number of credits								**19**

B. Tech VII SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
	18EE7T01	PCC	Digital Signal Processing	3	-	-	3	3
	18EE7T02	PCC	Power System Operation & Control	3	-	-	3	3
1	**Professional Elective-I**			3	-	-	3	3
	18EE7T03	PEC-I	Electric Vehicles					
	18EE7T04		Renewable Energy Sources					
	18EE7T05		Smart Grid Technologies					
4	**Professional Elective-II**			3	-	-	3	3
	18EE7T06	PEC-II	Programmable Logic Controllers					
	18EE7T07		AI Techniques					
	18EE7T08		Special Electrical Machines					
5		OEC-III	**Open Elective-III**	3	-	-	3	3
6	18EE7L09	PCC	Digital Signal Processing Lab	-	-	3	3	1.5
7	18EE7L10	PCC	Power Systems & Simulation Lab	-	-	3	3	1.5
8	18EE7P11	PROJ	Summer Internship / Mini Project	-	-	-	-	1
							Total number of credits	**19**

B. Tech VIII SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18EE8T01	PCC	Utilization of Electrical Energy	3	-	-	3	3
2	**Professional Elective-III**			3	-	-	3	3
	18EE8T02	PEC-III	Digital Control Systems					
	18EE8T03		Electrical Distribution Systems					
	18EE8T04		Power Electronic Control of Electric Drives					
3	**Professional Elective-IV**			3	-	-	3	3
	18EE8T05	PEC-IV	HVDC & FACTS					
	18EE8T06		Instrumentation					
	18EE8T07		Advanced Control Systems					
4		OEC-IV	MOOC/Open Elective IV	-	-	-	-	2
5	18EE8P09	PROJ	Project	-	-	-	-	8
							Total number of credits	**19**

Open Elective-I (V Semester)

S.No	Course Code	Course Category	Course Title	Offering Dept
1	18EE5T05	OEC	Quantitative Aptitude and Reasoning	BED
2	18EE5T06	OEC	Basics of Control Systems	EEE
3	18EE5T07	OEC	Electrical Engineering Materials	EEE

Open Elective–II (VI Semester)

S.No	Course Code	Course Category	Course Title	Offering Dept
1	18EE6T05	OEC	Basic Civil Engineering	CE
2	18EE6T06	OEC	Sustainable Engineering Practices	CE
3	18EE6T07	OEC	Design and Estimation of Electrical Systems	EEE
4	18EE6T08	OEC	Energy Audit, Conservation and Management	EEE
5	18EE6T09	OEC	Embedded Systems	ECE
6	18EE6T10	OEC	Computer Networks	CSE/IT

Open Elective–III (VII Semester)

S.No	Course Code	Course Category	Course Title	Offering Dept
1	18EE7T09	OEC	Fuzzy Sets and Fuzzy Logic	BED
2	18EE7T10	OEC	Remote sensing and GIS	CE
3	18EE7T11	OEC	Green Buildings	CE
4	18EE7T03	OEC	Electric Vehicles	EEE
5	18EE7T08	OEC	Special Electrical Machines	EEE
6	18EE7T12	OEC	Bio Medical Instrumentation	ECE
7	18EE7T13	OEC	Nano Electronics	ECE
8	18EE7T14	OEC	Software Project Management.	CSE/IT
9	18EE7T15	OEC	Computer Architecture & Organization	CSE/IT
10	18EE7T16	OEC	Technology Innovation Management	DMS
11	18EE7T17	OEC	Global Environment Trends	DMS

Open Elective-IV (VIII Semester)

S.No	Course Code	Course Category	Course Title	Offered by Dept
1	18EE8T08	OEC	Polymer Chemistry	BED
2	18EE8T09	OEC	Advanced Drawing for Civil Engineers	CE
3	18EE8T10	OEC	Power Quality	EEE
4	18EE8T11	OEC	Soft Computing Techniques	ECE
5	18EE8T12	OEC	Satellite communication	ECE
6	18EE8T13	OEC	Internet of Things	CSE
7	18EE8T14	OEC	Mechatronics	ME
8	18EE8T15	OEC	Green Engineering Systems	ME
9	18EE8T16	OEC	Micro - Electro - Mechanical Systems	ME

Note: Prior approval from the department is required for the selection of open electives

SEMESTER-I

SYLLABUS

ENGLISH-1

B.Tech I SEMESTER

L	T	P	C
2	0	0	2

Prerequisites: -

Course Outcomes

1. CO 1: Use English language, both written and spoken, competently and correctly.
2. CO 2: Improve comprehension and fluency of speech.
3. CO 3: Gain confidence in using English in verbal situations.
4. CO 4: Hone the communication skills to meet the challenges of their careers very successfully.
5. CO 5: Strengthen communication skills in different contexts like formal and informal.
6. CO 6: Develop knowledge of different fields and serve the society accordingly

Syllabus:

Unit 1	Human Resources
	Ideal Family
Unit 2	In London
	Verger
Unit 3	Our Living Environment
	Three Days to See
Unit 4	Part A: Energy: Alternative Sources
	War
Unit 5	Principles of Good Writing
	Letter Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

LINEAR ALGEBRA & DIFFERENTIAL CALCULUS

B.Tech I SEMESTER

L	T	P	C
3	1	0	4

Prerequisites: -

Course Outcomes:

- Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations
- Illustrate the methods of computing eigen values and eigen vectors
- Able to analyze the real life situations, formulate the differential equations then apply the solving methods
- Explain the techniques of solving the linear differential equations
- Optimize functions of several variables and able to find extreme values of constrained functions

Syllabus:

UNIT I: Linear systems of equations, Eigen values & Eigen vectors

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations.

Gauss -Jordan method, LU decomposition method, **Application:** Finding the current in electrical circuits, Eigen values, Eigen vectors, Properties of Eigen values(without proofs).

UNIT II: Quadratic forms & Differential calculus:

Cayley-Hamilton theorem(without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor's and Maclaurin's series.

Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor's theorem for functions of two variables. **Applications:** Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT III: Differential equations of first order:

Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli's equation, Exact differential equations.

Equations reducible to exact equations, **Applications:** Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth.

UNIT IV: Differential equations higher order:

Part –A: Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x).

Rules to find the particular integral(RHS term of the type e^{ax} V(x), any other function), Method of variation of parameters. **Application:** L-C-R circuits.

UNIT V: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t.

Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED CHEMISTRY

B.Tech I SEMESTER

L	T	P	C
3	0	0	3

Prerequisites: -

Course Outcomes

CO1: Study of polymers and composite materials enable us to use them in a good number of engineering fields

CO2: Industries are run by the quality of fuels and energy crisis can be met by broad understanding of different fuels

CO3: Electrochemical principles form the basis of batteries that are being developed. Destruction of metals and alloys can be prevented by understanding the science of corrosion.

CO4: Study of the existing developed materials forms a basis for developing more number of advanced materials

CO5: Methods of purification of water can be known so that more of them can be developed

CO6: The importance of engineering materials in the domestic and engineering fields can be understood.

Syllabus:

UNIT I: POLYMERS AND PLASTICS

Introduction- Degree of polymerization-functionality-tacticity-

Types- Addition polymerization-Definition-PVC-Properties-applications

condensation polymerization-Bakelite-Properties-applications

Physical and mechanical properties – Conducting polymers– Biodegradable polymers-applications– Natural rubber- Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol -Thermoplastics and Thermosetting plastics –- Composite materials & Fiber reinforced plastics

UNIT II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

:Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes)

Primary cells: Zinc – air cell

Secondary cells:- Lithium ion batteries, Pb-acid cell,

Fuel cells:- H_2-O_2 fuel cell and molten carbonate fuel cells

Corrosion: Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating -Electroless plating

UNIT III: NON CONVENTIONAL ENERGY SOURCES

Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance

Non-conventional energy sources:

(i) Hydropower include setup a hydropower plant (schematic diagram)

(ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant

(iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level.

(iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation.

(v) Biomass and biofuels

UNIT IV: SEMICONDUCTORS AND SUPER CONDUCTORS

Non –Elemental Semi conductors: Stoichiometric, Non- Stoichiometric ,Controlled valency & Chalcogen photo/semiconductors- Preparation of Semiconductors Ge & Si by crystal pulling technique – purification by Zone refining.

Semiconductor Devices:- Diode –Transistor.

Super conductors*:*-Definition-Types- Characteristics –applications

UNIT V: ADVANCED MATERIALS AND GREEN CHEMISTRY

Nano materials*:*-Introduction –General methods of preparation (top down and bottom up).**Liquid Crystals-**Definition, classification,applications

Green synthesis:- Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources(microwave method) -R4M4 principles-Econoburette.

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

UV Spectroscopy- Basic principle-Instrumentation- Applications

IR Spectroscopy- Basic principle-Instrumentation- Applications

NMR Spectroscopy- Basic principle-Instrumentation- Applications

Analytical techniques: FE-SEM,TEM,BET

Chromatography techniques: Paper chromatography, Thin layer chromatography-applications

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM

PROBLEM SOLVING APPROACHES THROUGH C

B.Tech I SEMESTER

L	T	P	C
3	0	0	3

Prerequisites: -

Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
- To use structures and files

Syllabus:

UNIT I

INTRODUCTION TO COMPUTERS

Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process.

BASICS OF C PROGRAMMING:

Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT II

Decision making statements: if, if else, nester if. Muti way decision making statements: else if, Switch statement

Looping statements: while, do while, for, Compilation process

UNIT III

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, Two dimensional arrays, Matrix Operations, Multi dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT IV

FUNCTIONS Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion , Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS

Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation.

UNIT V

STRUCTURES AND UNIONS

Structure , Nested structures , Pointer and Structures , Array of structures , Example Program using structures and pointers , Self referential structures, Unions.

FILE PROCESSING

Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command line arguments

Text Books:

1. Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2016.
2. Krnighan. B.W and Ritche, D.M, “The C Programming Language”, Second Edition, Pearson Education, 2006
3. Pradep dey, Manas Ghosh, “Fundamentals of Computing and programming in C”, First Edition, Oxford University Press, 2009.

References:

1. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh Edition, Pearson Publication.
2. E Balagursamy, “Programming in C, Sixth Edition, Tata McGraw Hill.
3. Ajay Mittal, “Programming in C A practical Approach”, Pearson education

ENGINEERING GRAPHICS

B.Tech I SEMESTER

L	T	P	C
3	0	0	3

Prerequisites: -

Course Outcomes:

CO1: Draw the polygons, ellipse, parabola, hyperbola, cycloids and involutes for various types of profiles.

CO2: Construction of various scales like plain, diagonal and venier scales .Draw the orthographic projections of the points, lines.

CO3: Draw the projections of planes.

CO4: Draw the projections of solids

CO5: Convert Orthographic projections to isometric projection and vice versa.

Syllabus:

UNIT I:

Lettering, Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods.

Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes- Tangent and Normals to the above curves.

UNIT II :

Orthographic projections: Introduction, Projections of points.

Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane;

Projections of planes inclined to both the reference planes.

UNIT IV:

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

UNIT V:

Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views.

Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text Books:

1. Engineering Drawing, N. D. Butt, Chariot Publications
2. Engineering Drawing +Auto CAD, K Venugopal &V Prabhuraja, Newage Publishers.

Reference Books:

1. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree, K. C. John, PHI Publishers
3. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers
4. Engineering Graphics, P.I. Varghese, McGraw Hill Publishers

ENGLISH COMMUNICATION SKILLS LAB-1

B.Tech I SEMESTER

L	T	P	C
0	0	2	1

Prerequisites: -

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1 **Greetings and Introduction**

2 **Request Permission & Giving Directions**

3 **Inviting/Complaining/Congratulating**

4 **Root Words**

5 **Phonetics-Sounds and Symbols**

6 **Pronunciation Rules**

References:

1. ***Strengthen Your Steps,*** Maruti Publications

2. ***Interact,*** Orient Blackswan

3. Word Power Made Easy, Pocket Books

APPLIED CHEMISTRY LAB

L	T	P	C
0	0	3	1.5

B.Tech I SEMESTER

Prerequisites: -

Syllabus:

1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na2CO3 and NaOH.
4	Determination of temporary and permanent hardness of water using standard EDTA solution.
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

PROBLEM SOLVING APPROACHES THROUGH 'C' LAB

B.Tech I SEMESTER

L	T	P	C
0	0	3	1.5

Prerequisites: -

Syllabus:

1. Write a C program to convert temperature from Fahrenheit to Celsius.
   Write a C program to find the roots of a quadratic equation.
   Write a program to implement simple calculator using switch case
2. Write a C program to determine if the given number is a prime number or not.
   Write a program to display the factorial of a given number
3. Write a program to display whether a given is Armstrong or not
   Write a C program to generate the first n terms of the Fibonacci sequence.
4. Write a C program to display the reverse of a given number.
   Write a C program to calculate the following sin and cos value
5. Write a program for sorting numbers in a list.
6. Write programs for searching a number in the list using
   a. Linear search
   b. Binary search
7. Write programs that reads two matrices to perform the following:
   a. Addition of two matrices
   b. Multiplication of two matrices
8. Write a program to perform the following operations without using build in string operations:
   a. To display the length of the string.
   b. To check whether the string is palindrome or not
   c. To delete n characters from a given position in a given string.
9. Write a program to generate GCD of two numbers using functions
10. Write a C program that reads two integers n and r to compute the ncr value using the following relation: ncr(n, r) = n! / r! (n,r)! . Use a function for computing the factorial value of an integer.
11. Write programs for the following using recursive functions
    a. Factorial of a given number
    b. GCD of two numbers
    c. Fibonacci series

12. Write a program to demonstrate call by value and call by reference.
13. Write a program to perform following operating using pointers
    a. Reverse of a string
    b. Comparison of two strings
14. Write a program for displaying the details of the student by sorting them according to the marks using structure containing roll no, name and marks.
15. Write a program for merging two files
16. Write a program to count no of lines, words, characters in a file
17. C Program to Create Employee File Name Record that is taken from the Command Line Argument

FIELD PRACTICE LAB

B.Tech I SEMESTER

L	T	P	C
0	0	2	1

Prerequisites: -

1. Study of various supply systems
2. Study of different switches, MCBs, measuring instruments, wires and cables.
3. Identification and measurement of resistance, inductance & capacitance.
4. Practice house wiring with MCB, 3 pin socket, 2 way control of lamp.
5. Practice soldering with simple electronic components on PCB.
6. Estimation of Power loads
7. Maintenance /Charging of the Batteries.
8. Testing and repair of Iron box, kettle
9. Testing of Refrigerator
10. Testing of Geyser

SEMESTER-II

SYLLABUS

ENGLISH II

B.Tech II SEMESTER

L	T	P	C
2	0	0	2

Prerequisites: -

Syllabus:

Unit 1 **a) Transport: Problems and Solutions**

b) The Scarecrow

Unit 2 **a) The Drunkard**

b) A Village Lost to the Nation

Unit 3 **a) Evaluating Technology**

b) The Knowledge Society

Unit 4 **a) Industry: Safety and Training**

b) Martin Luther King and Africa

Unit 5 **a) Man's Peril (Detailed)**

b) Report Writing

References:

1. **English for Engineers and Technologists,** Orient Blackswan
2. **Prose for Communication,** Ravindra Publishing House
3. **Panorama,** Oxford University Press

VECTOR CALCULUS AND FOURIER TRANSFORMS

B.Tech II SEMESTER

L	T	P	C
3	0	0	3

Syllabus:

UNIT I: Special functions & Multiple integrals:

Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Multiple Integrals: Double integrals in Cartesian & polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

UNIT II: Vector Calculus:

Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div& Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Vector Integration: Line integral, Green's theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

UNIT III: Fourier Series:

Euler's formulae(without proof), Conditions of a Fourier expansion, Functions having points of discontinuity.

Change of interval, Even and odd functions, Half-range series.

UNIT IV: Fourier Transforms:

Fourier Integral, Fourier cosine & sine integral, complex forms of Fourier integral.

Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms(without proof), Convolution theorem(without proof), finite Fourier sine & cosine transforms.

UNIT V: Applications of Partial Differential Equations:

Definition of PDE, Classification of 2^{nd} order PDE, Variable separable method, Vibrations of a stretched string – Wave equation.

One-dimensional heat flow, Two-dimensional heat flow, Solution of Laplace's equation.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi
   Publications, 9th Edition, 2014.
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED PHYSICS

B.Tech II SEMESTER **L T P C**
3 0 0 3

Prerequisites: -

Course Outcomes

CO1: Study of lasers and optical fibers with an emphasis of their application in communication in particular.

CO2: Outline the principles of Quantum mechanics to understand the principles of solid state materials for use in engineering applications.

CO3: The Analytical study of response of materials to Electromagnetic fields.

CO4: To study various magnetic and dielectric materials and their Engineering applications.

CO5: To Gain knowledge on the physics of semiconductors for their engineering applications.

Syllabus:

UNIT –I

LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Recording and Reconstruction of Holography-Applications.

OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Advantages of Optical Fibers in Communication – Applications in Communication.

UNIT – II

QUANTUM THEORY OF SOLIDS

Matter waves – Physical significance of wave function – Schrodinger's Time independent wave equation.

Schrodinger's Time dependent wave equation - Particle in a 1 Dimensional Potential well.

UNIT-III ELECTROMAGNETIC FIELDS

Grad – Div – Curl – Gauss and Stoke's theorems – Fundamental Laws of Electromagnetism.

Maxwell's Equations – Poynting vector – Propagation of Electromagnetic waves in a dielectric medium.

UNIT-IV

MAGNETIC MATERIALS

Origin of magnetic moment – Classification of magnetic materials (Dia, Para, Ferro) - Weiss theory of Ferromagnetic domains – Hysteresis – Soft and Hard magnetic materials - Applications.

DIELECTRIC MATERIALS

Types of Polarization – Dielectrics in DC and AC fields – Internal field – Clausius Mossoti Equation – Dielectric Loss and Dielectric Breakdown – Ferroelectric Hysteresis and applications.

UNIT-V

PHYSICS OF SEMICONDUCTORS

Carrier Concentration in Intrinsic semiconductor – Fermi level and electrical conductivity in intrinsic semiconductors - Carrier Concentration in Extrinsic semiconductors – Variation of Fermi level with temperature and impurity concentration.

Drift and Diffusion currents – Einstein's relation – Hall Effect & its applications.

Text Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications

2. Engineering Physics by M.Avadhanulu and P.G. Kshirasagar – S Chand Publications (10^{th} Edition)

3. Applied Physics by S.O.Pillai – New Age Publications – (3^{rd} Edition)

Reference Books:

1. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014 Edition)

2. Engineering Physics by M.Armugam – Anuradha Publications

3. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications

BIOLOGY FOR ENGINEERS

B.Tech II SEMESTER

L	T	P	C
2	0	0	2

Course Outcomes

After studying the course, the student will be able to:

CO1: Understand how biological observations lead to major discoveries and the morphological,
Biochemical and ecological classification of organisms.

CO2: Understand that all forms of life have the same building blocks and their involvement in the Maintenance and metabolic processes of living organisms.

CO3: Classify enzymes and distinguish between different mechanisms of enzyme action and Study the chemical reactions that are catalyzed by enzymes. Apply thermodynamic Principles to biological systems and able to understand major chemical processes that occur
Within a living organism in order to maintain life.

CO4: Identify DNA as a genetic material in the molecular basis of information transfer.

CO5: Identify and classify microorganisms, understand media compositions and growth of Microorganisms

Unit-1: Introduction

Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry.

Classification of organisms based on (a) Cellularity- Unicellular or Multicellular , (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

Unit-2: Biomolecules

Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function.

Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

Unit-3: Enzymes & Metabolism

Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters.

Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an

energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

Unit-4: Information Transfer

Concept of genetic code.

Molecular basis of information transfer; Transcription and translation.

Unit-5: Microbiology

Concept of species and strains, Identification of Micro organisms.

Sterilization and media compositions, Growth kinetics.

Text/Reference Books:

1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
3) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

POWER SYSTEMS-I

B.Tech II SEMESTER

L	T	P	C
3	0	0	3

Prerequisites: -

UNIT-I Thermal Power Stations

Selection of site, general layout of a thermal power plant showing paths of coal, steam, water, air, ash and flue gasses, ash handling system, Brief description of components: Boilers, Super, heaters, Economizers, electrostatic precipitators

Steam Turbines: Impulse and reaction turbines, Condensers, feed water circuit, Cooling towers and Chimney.

UNIT-II Hydel & Nuclear Power Stations

Hydro Power Stations: Choice of site, arrangement of hydroelectric installations, Hydrology. Mass curve, flow duration curve, classification of Hydro Power Plants, pumped storage plants.

Nuclear Power Stations: Location of nuclear power plant, Working principle, Nuclear fission, Nuclear fuels, Nuclear chain reaction, nuclear reactor Components: Moderators, Control rods, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR.Radiation: Radiation hazards and Shielding, nuclear waste disposal.

UNIT-III Solar power generation

Solar radiation spectrum. Radiation measurement. Applications of solar thermal systems Solar Photovoltaic(SPV) systems,

Applications of Solar Photovoltaic systems, Green Building, Solar – thermal, Solar – PV), Present Status of PV in India, Numerical problems

UNIT- IV Wind Power Generation

Introduction to wind energy, basic principles of wind energy conversion, forces on the blade power in the wind – maximum power, wind energy conversion – wind data and (qualitative treatment only) energy estimation, Basic components of wind energy conversion systems.

Classification of WECS-HAWT, VAWT, Geared wind power plants (WPPs), direct-drive WPPs and Hybrid (semi-geared) WPPs, Schemes of electric generation, Site selection considerations. Numerical problems

UNIT-V Economic Aspects of Power Generation & Tariff

Economic Aspects - Load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, power capacity factor and plant use factor, Base and peak load plants.

Tariff Methods- Costs of Generation and their division into Fixed, Semi-fixed and Running Costs, Desirable Characteristics of a Tariff Method, Tariff Methods: Simple rate, Flat Rate, Block-Rate, two-part, three–part, and power factor tariff methods.

Text Books:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, S.Bhatnagarand, A Chakrabarti, DhanpatRai& Co. Pvt. Ltd.
2. Generation, Distribution and Utilization of Electric Energy by C.L.Wadhawa New age International (P) Limited, Publishers
3. Non-Conventional Energy Resources/ Khan B.H/ Tata McGraw Hill, New Delhi, 2006

ELECTRICAL CIRCUIT ANALYSIS – I

B.Tech II SEMESTER

L	T	P	C
4	0	0	4

Syllabus:

Unit I: DC Circuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Network reduction techniques (series, parallel, series – parallel)

Star-to-delta and delta to- star transformation, Source transformation technique, nodal analysis and mesh analysis.

Unit II: AC Circuits

Periodic waveforms (determination of rms, average value and form factor), Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks, real power, reactive power, apparent power, power factor

Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), Series and Parallel Resonance.

Unit III: Network topology

Definitions of Graph and Tree, Basic cutset and tieset matrices for planar networks. Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality

Unit IV: Magnetic Circuits

Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits. Faraday's laws of electromagnetic induction,Concept of self and mutual inductance.

Dot convention-coefficient of coupling and composite magnetic circuit, Analysis of series and parallel magnetic circuits

Unit V: Network Theorems

Analysis of Superposition theorem, Thevenin theorem, Norton theorem for independent and dependent current and voltage sources.

Maximum power transfer theorem. Reciprocity theorem, Compensation theorem.

Text Books:

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.
3. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
4. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.

APPLIED PHYSICS LAB

B.Tech II SEMESTER

L	T	P	C
0	0	3	1.5

Prerequisites: -

(Any 10 of the following listed experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings - Sonometer
9. Determination of Young's modulus by method of single cantilever oscillations.
10. Melde's experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p - n junction.

BASIC ENGINEERING AND IT WORKSHOP

B.Tech II SEMESTER

L	T	P	C
0	0	3	1.5

Prerequisites: -

Engineering Workshop

1. Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

2. Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

3. Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

4. Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop 4. Funnel

IT Workshop

1. Identification of computer peripherals, installation of OS and troubleshooting.
2. Orientation and practice on MS Word.
3. Orientation and practice on MS Excel.
4. Orientation and practice on MS Power Point.
5. LAN & Wi-Fi Network connectivity using TCP/IP settings and customization of web browsers.
6. Introduction to HTML and design of basic web page.

ENVIRONMENTAL SCIENCE

B.Tech II SEMESTER

L	T	P	C
2	0	0	0

Prerequisites: -

Course Outcomes

- **CO1** The importance of environment, Natural resources and current global environmental Challenges for the sustenance of the life on planet earth.
- **CO2** The concepts of the ecosystem and its function in the environment
- **CO3** The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
- **CO4** The various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
- **CO5** The environmental legislations of India and Social issues and the possible means to
- **CO6** Environmental assessment and the stages involved in EIA.

UNIT-I MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of Environmental Studies- Importance of Environmental Studies- Need for public awareness, Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference, Earth summit

UNIT-II: ECOSYSTEM

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem ,Desert ecosystem- Aquatic ecosystem: pond ,lake ecosystem- Streams ,river ecosystem, Oceans

UNIT-III : NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources- Forest resources**:** Use and over-exploitation
- Deforestation-Timber extraction-Mining- Conservation- Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management- Energy resources**:** renewable energy sources –solar-wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas- Nuclear energy

UNIT-IV: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity- Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India- Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-V: ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects,control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-VI: ENVIRONMENTAL LEGISLATION &MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks-

Environmental Impact Assessment and its significance- Preparation of Envirronmental Management Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4.Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

SEMESTER-III

SYLLABUS

COMPLEX VARIABLES AND NUMERICAL METHODS (CVNM)

B.Tech III Semester

L	T	P	C
3	0	0	3

UNIT-I: Analytic Functions
Introduction, Complex function, Limit and continuity of a complex function, Derivative of f(z), Analytic functions, Harmonic functions & orthogonal system, Milne-Thomson method.
Applications: Applications to flow problems.

UNIT-II: Integration and Series Expansions
Complex integration, Cauchy's theorem and Cauchy's integral formula (without proofs), Series of complex terms, Taylor's series and Laurent's series (without proofs).

UNIT-III: Integration using Residues
Zeros & singularities of an analytic function, Residues, Residue theorem (without proof), Calculation of residues. Evaluation of integrals of the type (a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta,\sin\theta)d\theta$ (c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$ (d) Integrals by indentation.

UNIT IV: Numerical Solution of Equations:
Solution of Algebraic and transcendental equations: Bisection method, Method of false position and Newton-Raphson method (one variable and non-linear simultaneous equations). Iterative methods of solution of linear simultaneous equations: Jacobi's and Gauss-Seidel iteration methods.

UNIT V: Numerical Integration & Numerical Solution of ODE:
Numerical Integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rules.
Numerical Solution of ODE: Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of 4th order.

Text Books:
3. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
4. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:
3. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
4. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

ELECTRICAL CIRCUIT ANALYSIS-II

B.Tech III Semester

L	T	P	C
3	1	0	4

UNIT-I

Balanced Three phase circuits: Phase sequence- star and delta connection - relation between line and phase voltages and currents - analysis of balanced three phase circuits - measurement of active and reactive power.

UNIT-II

Unbalanced Three phase circuits: Analysis of three phase unbalanced circuits: Loop method – Star-Delta transformation technique, Two wattmeter methods for measurement of three phase power.

UNIT-III

Transient Analysis in DC and AC circuits: Transient response of R-L, R-C, R-L-C circuits for DC and AC excitations, Solution using differential equations and Laplace transforms.

UNIT-IV

Two Port Networks: Two port network parameters – Z, Y, ABCD and Hybrid parameters and their relations, Cascaded networks - Poles and zeros of network functions.

UNIT-V

Network synthesis: Positive real function - basic synthesis procedure - LC immittance functions - RC impedance functions and RL admittance function - RL impedance function and RC admittance function - Foster and Cauer methods.

Text Books:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,McGraw Hill Company,6 th edition
2. Network synthesis: Van Valkenburg; Prentice-Hall of India Private Ltd

Reference Books:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
2. Introduction to circuit analysis and design by TildonGlisson. Jr, Springer Publications.
3. Circuits by A.Bruce Carlson , Cengage Learning Publications
4. Network Theory Analysis and Synthesis by SmarajitGhosh, PHI publications
5. Networks and Systems by D. Roy Choudhury, New Age International publishers
6. Electric Circuits by David A. Bell, Oxford publications
7. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.

ANALOG ELECTRONICS-I

B.Tech III Semester

L	T	P	C
3	0	0	3

UNIT – I Semiconductor diodes: Review of Semi Conductor Materials, p-n Junction Diode, V-I Characteristics and its temperature dependence, Ideal and Practical Diode Equivalent Circuits, concept of Diode Resistance & Capacitances,

Zener and Avalanche breakdown, zener diode characterstics, zener diode as a voltage regulator.

UNIT-II Diode Circuits:Rectifiers: Half wave, full wave (Centre tapped, bridge) rectifiers, filters, Regulation and Ripple calculations.

Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers

UNIT – III Bipolar Junction Transistors:

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times, Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diodes

UNIT-IVField Effect Transistors: JFET, pinch-off voltage, Volt-ampere characteristics, MOSFET-Enhancement & Depletion mode, Volt-ampere characteristics, small signal model of FET, Biasing of FET,

UNIT -V Feedback amplifiers: Concept of Feedback, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances, voltage and current, series and shunt feedbacks. Introduction to power amplifier.

Oscillators: Barkhausen criterion, RC oscillators, Wien bridge, phase shift, LC Hartley and Colpitts oscillator, Crystal oscillators (BJT only), frequency stability of oscillator.

TEXT BOOKS:

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill

REFERENCE BOOKS:

1. Electronic Devices and Circuits by David A. Bell, Oxford University Press
2. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGraw Hill, Second Edition
3. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9thEdition, 2006

ELECTRICAL MACHINES-I

B.Tech III Semester

L	T	P	C
3	0	0	3

Unit – I: Electromechanical energy conversion principles

Basic Laws, electromechanical energy conversion principles – singly excited magnetic system, doubly excited magnetic system. Physical concept of torque production – electromagnetic torque & reluctance torque. Static and dynamic induced voltage, Lap and wave windings, AC windings and winding factors.

Unit – II: DC Generators

Construction details and operating principle, EMF equation, types of DC generators – separately excited, shunt, series and compound generators. Characteristics of DC generators, voltage build up in shunt generator, armature reaction & methods of reducing effect of armature reaction, commutation, losses and efficiency-applications.

Unit – III: DC Motors

Torque production, back EMF, types of DC motors – DC shunt, series and compound motor, characteristics of DC motors. Starters – need for starter, shunt, compound and series motor starters. Speed control methods armature and field control methods, brake test, swinburne's test, Hopkinson's test, losses and efficiency- applications.

Unit – IV: Single phase transformers

Construction details, types and operating principle of a transformer, ideal transformer, transformer on no load and with load, phasor diagrams, equivalent circuit, regulation, losses and efficiency, OC and SC test, Sumpner's test, all day efficiency, auto transformer, parallel operation of transformers.

Unit – V: Three phase transformers

Types of three phase transformers Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ, Tertiary winding, Scott connection, transients in switching – off load and on load tap changers.

Text Books:

1. Electrical Machines – P.S. Bhimbra, Khanna Publishers
2. Electric Machinery by A.E.Fitzgerald,Charleskingsley,StephenD.Umans, TMH

Reference Books:

1. Electrical Machines by D. P.Kothari, I .J .Nagarth,McGrawHill Publications, 4th edition
2. Electrical Machines by R.K.Rajput, Lakshmi publications,5th edition.
3. Electrical Machinery by AbijithChakrabarthi and SudhiptaDebnath,McGraw Hill education 2015
4. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill education 2010
5. Theory & Performance of Electrical Machines by J.B.Guptha. S.K.Kataria& Sons

ELECTROMAGNETIC FIELDS

B.Tech III Semester

L	T	P	C
3	0	0	3

UNIT-I

ELECTROSTATICS: Coulomb's law and field intensity, Electric fields due to continuous charge distributions, Electric flux density. Gauss's law – Maxwell's Equation, applications of Gauss's law, Electric potential, relationship between E and V – Maxwell's Equation, an electric dipole and flux lines, energy density in electrostatic fields.

UNIT- II

CONDUCTORS AND DIELECTRICS: Behavior of Conductors in an Electric Field-Conductors and Insulators – Electric Field Inside a Dielectric Material – Polarization – Dielectric Conductors and Dielectric Boundary Conditions – Capacitance-Capacitance of Parallel Plate, Spherical & Co-axial capacitors – Energy Stored and Energy Density in a Static Electric Field – Current Density – Conduction and Convection Current Densities – Ohm's Law in Point Form – Equation of Continuity

UNIT-III

MAGNETO STATICS AND AMPERE'S LAW: Static Magnetic Fields – Biot-Savart Law – Oerstead's experiment – Magnetic Field Intensity(MFI) due to a Straight, Circular &Solenoid Current Carrying Wire – Maxwell's Second Equation. Ampere's Circuital Law and its Applications Viz., MFI Due to an Infinite Sheet of Current and a Long Current Carrying Filament – Point Form of Ampere's Circuital Law – Maxwell's Third Equation

UNIT – IV

MAGNETIC FORCE AND ENERGY IN MAGNETIC FIELDS: Magnetic Force – – Lorentz Force Equation – Force on Current Element in a Magnetic Field - Force on a Straight and Long Current Carrying Conductor in a Magnetic Field - Force Between two Straight and Parallel Current Carrying Conductors. Self and Mutual Inductances – Neumann's Formulae – Determination of Self Inductance of a Solenoid and Toroid and Mutual Inductance Between a Straight, Long Wire and a Square Loop Wire in the Same Plane – Energy Stored and Intensity in a Magnetic Field

UNIT-V

TIME VARYING FIELDS: Faraday's Law of Electromagnetic Induction – It's Integral and Point Forms – Maxwell's Fourth Equation. Statically and Dynamically Induced E.M.F's -Modified Maxwell's Equations for Time Varying Fields – Displacement Current. Uniform Plane Wave equation Poynting Theorem, Poynting Vector and its Significance**.**

TEXT BOOKS:

1. Principles of Electromagnetics, 6th Edition, Sadiku, Kulkarni, OXFORD University Press, 2015
2. Engineering Electromagnetics, William.H.Hayt, Mc.Graw Hill, 2010.

REFERENCE BOOKS:

1. Electromagnetics 5th edition, J.D.Kraus,Mc.Graw – Hill Inc, 1999.
2. Field & Electromagnetic waves – 2nd edition, David K. Cheng
3. Electromagnetics, Joseph Edminister, Tata Mc Graw Hill, 2006.

BASICS OF MECHANICAL ENGINEERING

B.Tech III Semester

L	T	P	C
3	0	0	3

Unit-I

Heat and Work: Heat and Work, Point and Path function. Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry –Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM I, Problems on heat and work for various processes.

First law of thermodynamics, application of steady flow energy equation to various components of a power plant (boiler, turbine, condenser and pump), Carnot engine.

UNIT-II

Introduction to cycles: Power cycle: Introduction to 2 stroke and 4 stroke engine, Otto cycle, Diesel cycle, problems on Otto and Diesel cycle

Refrigeration cycle: Refrigerant, Vapour compression refrigeration (VCR) cycle, Problems on VCR cycle, vapour absorption refrigeration cycle, domestic refrigerator, window and split AC.

Unit-III

Hydro Prime Movers: Hydraulic Turbines: Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine, Performance and characteristic curves.

Hydro Power: Components of hydro-electric power plant, Estimation of water power potential, Estimation of load on turbines: load curve, load factor, capacity factor, utilization factor, diversity factor, load-duration curve, firm power, secondary power, prediction of load.

Unit-IV

Introduction to Engg. Mechanics – Basic Concepts. Systems of Forces: Coplanar Concurrent Forces– Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, analysis of plane trusses.

Unit-V

Stresses and strains: kinds of – stress-strains, elasticity and plasticity, Hooks law, stress –strain diagrams, modules of elasticity, Poisson's ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

Types of supports– loads – Shear force and bending moment for cantilever and simply supported beams without overhanging for all types of loads.

Text books:

1. Engineering Thermodynamics , PK Nag 4th Edn , TMH.
2. Hydraulics & Fluid Mechanics Including Hydraulics Machines, Dr. P.N. Modi & Dr. S.M. Seth, Rajsons Publ, 21st Ed., 2017.
3. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications
4. Strength of materials by Bhavikatti, Lakshmi publications.

References:

1. A Textbook of Elements of Mechanical Engineering", S Trymbaka Murthy, University Press(India) Pvt Ltd, 4th Edition, 2006.6

ELECTRICAL CIRCUITS LAB

B.Tech III Semester

L	T	P	C
0	0	3	1.5

List of Experiments

Any 10 of the following experiments are to be conducted:

1) Verification of Thevenin's and Norton's Theorems
2) Verification of Superposition theorem and Maximum Power Transfer Theorem
3) Verification of Compensation Theorem
4) Verification of Reciprocity , Millmann's Theorems
5) Locus Diagrams of RL and RC Series Circuits
6) Series and Parallel Resonance
7) Determination of Self, Mutual Inductances and Coefficient of coupling
8) Z and Y Parameters
9) Transmission and hybrid parameters
10) Parameters of a choke coil.
11) Determination of cold and hot resistance of an electric lamp.
12) Measurement of 3-phase Power by two Wattmeter Method for unbalanced loads

ANALOG ELECTRONICS LAB

B.Tech III SEMESTER

L	T	P	C
0	0	3	1.5

List of Experiments

Electronic Workshop Practice:

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

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List of Experiments: (Minimum of Ten Experiments has to be performed)

1. P-N Junction Diode Characteristics
   Part A: Germanium Diode (Forward bias& Reverse bias)
   Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
   Part A: V-I Characteristics
   Part B: Zener Diode as Voltage Regulator
3. Rectifiers (without and with c-filter)
   Part A: Half-wave Rectifier
   Part B: Full-wave Rectifier
4. BJT Characteristics(CE Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
5. FET Characteristics(CS Configuration)
   Part A: Drain Characteristics
   Part B: Transfer Characteristics
6. Transistor Biasing
7. CRO Operation and its Measurements
8. BJT-CE Amplifier
9. Emitter Follower-CC Amplifier
10. FET-CS Amplifier
11. Clippers with different reference voltages
12. Clampers with different reference voltages
13. RC phase shift oscillator

EDUCATION, TECHNOLOGY AND SOCIETY

B.Tech III Semester

L	T	P	C
2	0	0	0

UNIT 1: Necessity of education for human life, Impact of education on society

UNIT 2: Nature and scope of education (Gurukul to ICT driven), Emotional intelligence Domains of learning, Approaches to learning, Learning outcomes

UNIT 3: Role of education in technology advancement.

UNIT 4: Technology and society; management of technology; technology transfer

UNIT 5: Ethical and value implications of education and technology on individual and society

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REFERENCE BOOKS:

1. Education and Social order by Bertrand Russel
2. Theories of learning by Bower and Hilgard
3. Technology and Society by Jan L Harrington

SEMESTER-IV

SYLLABUS

ANALOG ELECTRONICS-II

	L	T	P	C
B.Tech IV Semester	**3**	**0**	**0**	**3**

UNIT –I Multivibrators : Analysis and Design of Bistable, Monostable, Astable Multivibrators using transistors

Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement.

UNIT - II: Operational Amplifier: Basic information of op-amp, block diagram of op-amp, Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, buffer,

UNIT-III Applications of Op-Amp: Instrumentation amplifier, ac amplifier, V to I and I to V converters, Sample & hold circuits, logarithm & antilogarithm amplifier, multiplier and divider, differentiator and integrator, comparator, Schmitt trigger, Multivibrators, waveform Generators - Triangular, Sawtooth, Square wave

UNIT - IV: Active filters &IC 555 Timer: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters,

IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, Introduction to PLL.

UNIT - V: Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approxiamtion ADC and Dual Slope ADC, DAC and ADC Specifications.

TEXT BOOKS:

1. Linear Integrated Circuits – D. Roy Choudhury, New Age International (p) Ltd, 2nd Edition,2003.

2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

3.Operational Amplifiers–C.G. Clayton, Butterworth & Company Publ. Ltd./Elsevier, 1971

4. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill

5. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005

REFERENCES :

1. Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria &Sons;2nd Edition,2010

2. Design with Operational Amplifiers & Analog Integrated Circuits – Sergio Franco, McGraw Hill, 1988.

3. OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd.

4. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition.

5. Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition

ELECTRICAL MACHINES-II

B.Tech IV Semester

L	T	P	C
3	0	0	3

Unit – I: Three phase induction motors

Construction, types, concept of rotating magnetic field, principle of operation, slip, torque, characteristics, equivalent circuit, phasor diagram, power, losses and efficiency, circle diagram of induction motor, starting methods - squirrel cage and slip ring induction motor. Double squirrel cage induction motor, speed control, concept of induction generator (self-excited)-applications.

Unit – II: Single phase induction motors

Double field revolving theory, starting methods of single phase motors, constructional features, principle of operation and equivalent circuits of single phase induction motors – capacitor start & run induction motor, shaded pole motors, AC series motor-applications.

Unit – III: Synchronous generators

Constructional features, types, EMF equation, winding factors, armature reaction, synchronous reactance, Alternator on load with vector diagrams, voltage regulation methods- EMF, MMF, ZPF. two reaction theory of salient pole synchronous machine, phasor diagram,.

Unit – IV: Parallel operation of Synchronous generators

synchronization methods, alternator connected to infinite bus bar , parallel operation of two alternators, effect of change in excitation and mechanical input-Applications.

Unit V: Synchronous motors

Principle of operation, starting torque, starting methods, effect of increased load with constant excitation, effect of changing excitation with constant load, v and inverted v curves, power developed, hunting and damper windings, synchronous condenser, applications.

Text Books:

1. Electrical Machines – P.S. Bhimbra, Khanna Publishers
2. Electric Machinery by A.E.Fitzgerald,Charleskingsley,StephenD.Umans, TMH

Reference Books:

1. Electrical Machines by D. P.Kothari, I .J .Nagarth,McGrawHill Publications, 4th edition
2. Electrical Machines by R.K.Rajput, Lakshmi publications,5th edition
3. Electrical Machinery by AbijithChakrabarthi and SudhiptaDebnath,McGraw Hill education 2015
4. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill education 2010
5. Electric Machines by MulukutlaS.Sarma&Mukeshk.Pathak, CENGAGE Learning.
6. Theory & Performance of Electrical Machines by J.B.Guptha. S.K.Kataria& Sons

CONTROL SYSTEMS

B.Tech IV Semester

L	T	P	C
3	0	0	3

UNIT – I

Mathematical Modeling of Control Systems: Classification of control systems, Open Loop and closed loop control systems and their differences, Feed-Back Characteristics, transfer function of linear system, Differential equations of electrical networks, Translational and Rotational mechanical systems, Transfer Function of DC Servo motor - AC Servo motor- Synchro, transmitter and receiver – Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT-II

Time Response Analysis : Standard test signals - Time response of first and second order systems - Time domain specifications - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – III

Stability and Root locus Technique: The concept of stability – Routh's stability criterion – limitations of Routh's stability –Root locus concept - construction of root loci

UNIT–IV

Frequency Response Analysis:

Introduction to Frequency domain specifications-Bode diagrams- transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Stability criterion. Basic concepts of compensators.

UNIT–V

State Space Analysis of LTI Systems: Concepts of state, state variables and state model, state space representation of transfer function, Diagonalization- Solving the time invariant state equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

Text Books:

1. Control Systems principles and design, M.Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition.
2. Automatic control systems, Benjamin C.Kuo, Prentice Hall of India,2ndEdition.

Reference Books:

1. Modern Control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2. Control Systems, ManikDhanesh N, Cengage publications.
3. Control Systems Engineering, I.J.Nagarath and M.Gopal, Newage International Publications, 5th Edition.
4. Control Systems Engineering, S.Palani,TataMcGraw Hill Publications.

POWER SYSTEMS - II

B.Tech IV Semester

L	T	P	C
3	0	0	3

UNIT I

TRANSMISSION LINE PARAMETERS: Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines.

UNIT II

MODELING OF TRANSMISSION LINES: Classification of Transmission Lines - Short, medium and long line and their model - representations - Nominal-T, Nominal-Pie and A, B, C, D Constants. Mathematical Solutions to estimate regulation and efficiency of all types of lines- Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations – Representation of Long lines – Equivalent T and Equivalent – π. Surge Impedance and surge Impedance loading - wavelengths and Velocity of propagation – Ferranti effect, Charging current.

UNIT III

INSULATORS, CORONA AND MECHANICAL DESIGN OF LINES:

Insulators: Types of Insulators- String efficiency and Methods for improvement– Voltage Distribution, Calculation of string efficiency- Capacitance grading and Static shielding.

Corona: Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

Mechanical design of lines: Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor - Stringing chart and sag template and its applications.

UNIT IV

TRAVELLING WAVES ON POWER SYSTEMS: Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction -Bewley's Lattice Diagrams.

UNIT V

POWER CABLES: Types of Cables, Types of Insulating materials, Calculations of Insulation resistance and stress- Capacitance of Single and 3-Core belted cables, Grading of Cables - Capacitance grading, Description of Inter-sheath grading.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, Dhanpat Rai & Co. Pvt. Ltd., 1999.
2. Electric Power Generation Distribution and Utilization by C.L Wadhwa, New Age International (P) Ltd., 2005.
3. Principles of Power Systems by V.K Mehta and Rohit Mehta S.CHAND&COMPANY LTD., New Delhi 2004.

REFERENCE BOOKS:

1. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003
2. Power System Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill Education (India) Pvt. Ltd., 2nd Edition, 2008, 23rd Reprint 2015.
3. Electric Power Transmission System Engineering: Analysis and Design, TuranGonen, 2nd Edition, CRC Press, Taylor & Francis group, 2009, 1st Indian Reprint 2010.

DIGITAL ELECTRONICS

B.Tech IV Semester

L	T	P	C
3	0	0	3

UNIT- I

Introduction, Binary Numbers, Number base conversions, Complements of numbers, Signed binary numbers, Binary codes, Error detection and correction codes.

Boolean Algebra-Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, logic operations & Logic gates.

UNIT-II

Introduction, the map method, four variable, Five variable Kmap, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, Other two level Implementation, Ex-or Function, Quine-McCluskey Technique-simplification of Boolean function using tabulation Method..

UNIT-III

Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit, look-a-head adder circuit, Design of decoder, demultiplexer, 7 segment decoder, higher order demultiplexing, encoder, multiplexer, higher order multiplexing, realization of Boolean functions using decoders and multiplexers, priority encoder, 4-bit digital comparator.

UNIT- IV

Sequential Logic: Basic latch circuit - Flip-flops: SR, JK, D and T, Truth table and excitation tables and conversion.

Registers & Counters: Registers, Shift registers, Applications of registers, Ripple & Synchronous counters- up/down counter, Ring counters, Twisted Ring counter.

UNIT-V

Design of Digital Systems: Programmable Logic devices: Introduction, PROM, PLA, PAL. Concept of state, State diagram and state reduction techniques

Introduction to digital logic families : Diode logic , RTL, DTL,TTL, ECL,CMOS

Text Books:

1. Morris Mano M., Digital Design, Prentice Hall of India, 3rd Edition, 2002.
2. Donald Pleach, Albert Paul Malvino, Goutamsaba Digital Principles and Applications, McGraw- Hill, 6th Edition, 2006.

Suggested Reading:

1. Tocci, Widmer, Moss, Digital Systems, Principles and Applications, Pearson Education, 10th Edition, 2016.
2. B. Somnath Nair, Digital Electronics and Logic Design, Prentice Hall of India, Eastern Economy, Edition, 2006.

DATA STRUCTURES THROUGH 'C'

B.Tech IV Semester

L	T	P	C
3	0	0	3

SYLLABUS:

UNIT - I:

Sortings: Bubble sort, Section sort ,Quick sort, Merge sort, Radix sort.
Searching: linear search, binary search

UNIT II:

Data structures: Definition, Recursion: Definition, recursive algorithms for factorial function, GCD, Towers of Hanoi problem, Fibonacci series.

UNIT III:

Stacks: Definition, Representing stacks, ADT Stack and its operations: Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms.

UNIT IV:

Queues: Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

UNIT V:

Linked lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; **Doubly linked list:** operations and algorithms.
Circular Linked Lists: All operations their algorithms.

Text Books:

1) Data Structures using C, Reema Thareja, Oxford.
2) Data Structures, 2/e,Richard F,Gilberg, Forouzan, Cengage.
3) Data Structures and Algorithm Analysis in C, 2nd ed, Mark Allen Weiss.

Reference Books:

1. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH.
2. Classic Data Structures,2/e,Debasis,Samanta, PHI,2009.
3. Fundamentals of Data Structure in C,2/e, Horowitz, Sahni,Anderson Freed,UniversityPress

CONTROL SYSTEMS AND SIMULATION LAB

B.Tech IV Semester

L	T	P	C
0	0	3	1.5

LIST OF EXPERIMENTS

PART-A

Any 8 of the following experiments are to be conducted:

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – characteristics of stepper motor
4. Effect of feedback on DC servo motor
5. Effect of P, PD, PI, PID Controller on a second order systems
6. Lag and lead compensation – Magnitude and phase plot
7. DC position control system
8. Transfer function of separately excited DC motor
9. Temperature controller using PID controller
10. Characteristics of magnetic amplifiers
11. Characteristics of AC servo motor
12. Characteristics of DC servo motor
13. Potentiometer as an error detector

PART-B

Any 2 of the following experiments are to be conducted:

1. Simulation of transient response of RLC circuits
   a. Response to pulse input
   b. Response to step input
   c. Response to sinusoidal input
2. Plotting of Bode plots, root locus and nyquist plots for the transfer functions of systems up to 5th order
3. Simulation of D.C separately excited motor using transfer function approach.

B.Tech IV Semester

L	T	P	C
0	0	3	1.5

ELECTRICAL MACHINES – I LAB

LIST OF EXPERIMENTS

Any 10 of the following experiments are to be conducted

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Brake test on DC shunt motor. Determination of performance curves.
3. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
4. Swinburne's test and Predetermination of efficiencies as Generator and Motor.
5. Speed control of DC shunt motor by Field and armature Control.
6. Retardation test on DC shunt motor. Determination of losses at rated speed.
7. Separation of losses in DC shunts motor.
8. OC& SC test on single phase transformer.
9. Sumpner's test on single phase transformer.
10. Scott connection of transformers
11. Parallel operation of Single phase Transformers
12. Separation of core losses of a single phase transformer

DATA STRUCTURES THROUGH 'C' LAB

B.Tech IV Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

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

1. Implement search and sorting techniques
2. Develop recursive solutions to a given problem
3. Implement data structures like stacks, queues, lists and compare their Performance.

LIST OF EXPERIMENTS

1. Write C programs to sort the list of elements using following techniques
   a. Bubble Sort b. Selection Sort
2. Write C programs to sort the list of elements using following techniques
   a. Quick Sort b. Merge Sort
3. Write C programs to search for an element in an array using following techniques
   a. Linear Search b. Binary Search
4. Write recursive C programs for the following
   a. Factorial of a number b. Fibonacci series c. GCD d. Towers of Hanoi
5. Write a C program to perform stack operations using arrays
6. Write a C program to perform queue operations using arrays
7. Write C program to implement stack applications.
   a. Conversion of Infix expression to postfix expression
   b. Evaluation of postfix expression

8. Write a C program to implement following operations on Single Linked List

a. Insertion b. Deletion c. Search

9. Write a C program to implement stack operations using linked list

10. Write a C program to implement queue operations using linked list

SEMESTER-V

SYLLABUS

POWER ELECTRONICS

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To study the characteristics of various power semiconductor devices and their switching operation.
- To understand the operation of $1-\emptyset$ & $3-\emptyset$ full–wave converters and their harmonic analysis.
- To understand the operation of different types of DC-DC converters.
- To understand the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
- To analyze the operation of AC-AC controllers.

Course Outcomes:

Student should able to

- Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's.
- Explain the operation of single phase & three Phase full–wave converters and analyze harmonics in the input current.
- Analyze the operation of different types of DC-DC converters.
- Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
- Analyze the operation of AC-AC regulators.

SYLLABUS

UNIT-I

Power Semiconductor Devices: Thyristors – Silicon Controlled Rectifiers (SCRs) – BJT – Power MOSFET – Power IGBT and their characteristics. Basic theory of operation of SCR – Static and Dynamic characteristics of SCR – Triggering and commutation methods – Turn on and turn off methods. Gate driver circuits for SCR & IGBT - Snubber circuit details

UNIT-II

AC to DC converters: Principles of phase controlled rectification -Study of Single phase and three-phase half controlled and full controlled bridge rectifiers with R and RL loads. Effect of source inductance. Dual converters- circulating current mode and circulating current free mode control strategies.

UNIT-III

DC to DC converters: Analysis of Buck, boost, buck-boost converters in Continuous Conduction Mode (CCM) and Discontinuous Conduction Modes (DCM) – Output voltage equations. Principle operation of forward and fly back converters in CCM.

UNIT-IV

DC to AC converters: Principle of operation of Single phase Inverters -Three phase bridge Inverters (180^0 and 120^0 modes)-voltage control of inverters-Single pulse width modulation-

multiple pulse width modulation, sinusoidal pulse width modulation. Harmonic reduction techniques- basics of Voltage Source Inverters and Current source Inverters - Comparison of VSI and CSI

UNIT-V

AC to AC Converters: Static V-I characteristics of TRIAC and modes of operation – 1-phase AC-AC regulator phase angle control and integrated cycle control with R and RL load – For continuous and discontinuous conduction- 3-Phase AC-AC regulators with R load.

Text Books:

1. Power Electronics – by P.S.Bhimbra, Khanna Publishers.
2. Power Electronics by M. D. Singh and K. B. Khanchandani
3. Power Electronics: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India

Reference Books:

1. Power Electronics: Essentials & Applications by L.Umanand, Wiley, Pvt. Limited, India
2. Power Electronics by VedamSubramanyam, New Age International (p) Limited, Publishers.
3. Power Electronics by P.C. Sen, Tata Mc Graw-Hill Publishing.

ELECTRICAL MEASUREMENTS

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objective:

- To study the principle of operation and working of different types of instruments
- To study the working principle of operation instruments for measurement of power & energy
- To understand the principle of operation and working of potentiometers.
- To understand the principle of operation and working of various types of bridges for measurement of parameters –resistance, inductance, capacitance and frequency.
- To study the applications of CRO for measurement of frequency, phase difference and hysteresis loop using Lissajous patterns

Course Outcomes:

- Able to choose right type of instrument for measurement of voltage and current for AC and DC.
- able to choose right type of instrument for measurement of power and energy and able to calibrate energy meter by suitable method
- Able to calibrate ammeter and potentiometer.
- Able to select suitable bridge for measurement of electrical parameters
- Able to use digital instruments in electrical measurements.

SYLLABUS

UNIT-I

Measuring Instruments: Classification of measuring instruments. Requirements of measuring instruments. Deflecting, control and damping torques.PMMC instrument, moving iron attraction and repulsion type instruments. Errors and compensations– Extension of range using shunts and series.

UNIT-II

Measurement of Power and Energy: Construction ,working and torque equation of single and three phase Dynamometer wattmeters. Errors and their compensation. LPF wattmeter. Two wattmeter method, measurement of reactive power. Construction ,working and torque equation of Single phase induction type Energy meter. Errors and their compensation. Testing by phantom loading using R.S.S. meter. Single phase Power factor meter-electro dynamometer type and moving iron type.

UNIT-III

Instrumentation transformers and Potentiometers: Construction of CT and PT, Ratio and phase angle errors. Potentiometers: Standardization. Principle and working of potentiometers. Standardization of potentiometer, Crompton's DC potentiometer

UNIT-IV

Measurement of parameters: Measurement of Resistance: Voltmeter-ammeter method. Kelvin's Double Bridge, Megger. A.C. Bridges: Balance equation for an AC bridge.

Measurement of Inductance: Maxwell's Bridge, Anderson's Bridge. Measurement of Capacitance: Schering Bridge, Wien's Bridge.

UNIT-V

Digital meters

Digital Voltmeter: Successive approximation type, Ramp type and integrating type. Digital frequency meter–Digital multimeter–Digital Tachometer.

Text Books:

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C.Widdis, fifth Edition, Wheeler Publishing.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

Reference Books:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney DhanpatRai & Co.Publications.
2. Electrical and Electronic Measurements and instrumentation by R.K.Rajput, S.Chand.
3. Electrical Measurements – by Buckingham and Price, Prentice – Hall
4. Electrical Measurements by Forest K. Harris. John Wiley and Sons

PYTHON PROGRAMMING

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objectives:

Making Software easily right out of the box. Experience with an interpreted Language. To build software for real needs.

Course Outcomes:

Upon successfully completing this course, students will be able to

- Identify/characterize/define a problem
- Design a program to solve the problem
- Create executable code
- Read most Python code

SYLLABUS

UNIT – I:

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

UNIT – II:

Types, Operators, and Expressions: Types – Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while break, continue, pass

UNIT – III:

Data Structures Lists – Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

UNIT – IV:

Functions – Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function- Global and Local Variables. Modules: Creating modules, import statements, from. The import statement, namespacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT – V:

Object-Oriented Programming OOP in Python: Classes, ‘self-variable’, Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding, Error, and Exceptions: Difference between an error and Exception, Handling Exception, try except for block, Raising Exceptions, User Defined Exceptions

TEXT BOOKS

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. “Python in easy steps In Easy Steps”, Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.
6. “Introduction to Programming Concepts with Case Studies in Python”, Gokturk Ucoluk Sinan Kalkan, Springer.

EFFECTIVE TECHNICAL COMMUNICATION

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objective:

- To practice vocabulary building.
- To study the writing skills.
- To identify common errors in writing.
- To improve oral communication.
- To study different life skills.

Course Outcomes:

- Able to speak with fluent vocabulary.
- Able to write with proper sentence formation.
- Able to identify errors in writing.
- Able to communicate orally.
- Able to analyze different life skills.

SYLLABUS

Unit I Vocabulary Building
The concept of word formation
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
Synonyms, antonyms, and standard abbreviations

Unit II Writing Skills
Sentence structures
Use of phrases and clauses in sentences
Importance of proper punctuation
Creating coherence
Organizing principles of paragraphs in documents
Comprehension
Essay writing

Unit III Identifying Common Errors in Writing
Subject-verb agreement
Noun-pronoun agreement
Misplaced modifiers
Articles
Prepositions
Redundancies
Clichés

Unit IV Oral Communication
Common everyday situations: Conversations and Dialogues
Communication at workplace

Interviews
Formal presentations

Unit V Life Skills
Self-assessment and self-esteem
Attitudes, values and beliefs
Personal goal setting
Career planning
Managing time
Complex problem-solving
Creativity

Suggested Readings:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007.
3. On Writing Well. William Zinsser. Harper Resource Book. 2001.
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
7. You Can Win. Shiv Khera. Macmillan Books, New York, 2003.

ELECTRICAL ENGINEERING MATERIALS

(Open Elective-I)

L	T	P	C
3	0	0	3

B.Tech V Semester

Course Objectives:

- To study about different conducting materials
- To study about different semiconducting materials.
- To understand the properties of insulating materials.
- To understand the properties of dielectric and magnetic materials.
- To study about different special purpose materials.

Course Outcomes:

- Able to analyze different conducting materials
- Able to differentiate different semiconducting materials.
- Able to explain different properties of insulating materials.
- Able to explain the properties of dielectric and magnetic materials.
- Able to analyze different special purpose materials.

SYLLABUS

Unit I

Conducting Materials: Conducting Materials – Properties -Hardening, Annealing – Its effects- Low Resistive Materials – Requirements – Properties and applications of Copper and Aluminum - Comparison between Copper and Aluminum - ACSR Conductors, AAAC, - High Resistive Materials – Requirements- Properties and applications of Manganin, Eureka, Constantan, Nichrome, Tungsten, Platinum, Mercury and Carbon- Color coding of Resistors.

Unit II

Semiconducting Materials: Types of semiconductors, Intrinsic semiconductors, impurity type semiconductor, diffusion, the Einstein relation, hall effect, Properties of semiconductors, thermal conductivity of semiconductors, electrical conductivity of doped materials. Different semi-conducting materials (silicon and germanium) used in manufacture of various semiconductor devices (i.e p-type and n-type semiconductors) Materials used for electronic components like resistors, capacitors, diodes, transistors and inductors etc.

Unit III

Insulating Materials: Properties -Insulation resistance - Factors effecting Insulation resistance - Classification of Insulating materials - Properties & Applications of Impregnated Paper, Wood, Card Board, Asbestos, Mica, Ceramic, Glass- Thermo Plastics, Thermo Setting resins – PVC- Effects on PVC

Unit IV

Di- electric materials: Permittivity of different Di - electric materials- Polarization - Dielectric Loss – Applications of Dielectrics – Color codes of Capacitors.

Magnetic Materials: Classification of magnetic materials - Soft & Hard magnetic materials- B-H Curves - Hysteresis loop - Hysteresis loss - Steinmetz constant - Eddy Current Loss -- Curie Point – Magnetostriction.

Unit V

Special Purpose Materials: Need of Protective materials – List of Special Purpose Materials (Lead, Paints, Steel Tapes) - Thermocouple - Bi-metals- Soldering- Fuses -Galvanizing and Impregnating - Use Enameled Coated Copper Wires- Nano Materials.

Text Books:

1. Electrical Engineering MaterialsAdrianus J Dekker,Phi Learning Publishers.
2. Introduction to Engineering materials – B.K.Agarwal

References:

1. ElectricalPropertiesof Materials, 8th Edition by Solymar, L, Oxford University Press-New Delhi.
2. Introductionto ElectricalEngineeringMaterials4th Edn. 2004 Edition by Indulkar C, S. Chand & Company Ltd-New Delhi.
3. Electronic Components -Dr.K.Padmanabham
4. Electronic Components -D.V.Prasad.
5. Material science for Electrical and Electronic Engineers – Ian P.Jones (Oxford Publications)

BASICS OF CONTROL SYSTEMS

(Open Elective-I)

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objective:

- To study merits and demerits of open loop and closed loop systems; the effects of feedback, the use of block diagram algebra and Mason's gain formula.
- To study Transient and steady state responses , time domain specifications
- To study the concept of Root loci
- To study frequency domain specifications, Bode diagrams and Nyquist plots
- To study the fundamental aspects of modern control

Course Outcomes:

Upon successful completion, the student can able to

Evaluate the effective transfer function of a system from input to output using (i) block diagram reduction techniques (ii) Mason's gain formula
Compute the steady state errors and transient response characteristics for a given system and excitation
Determine the absolute stability and relative stability of a system
Draw root loci &Design a compensator to accomplish desired performance
Derive state space model of a given physical system and solve the state equation

SYLLABUS

UNIT-I
SYSTEMS AND REPRESENTATION: Basic elements in control systems: – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function of DC servo motor – Block diagram reduction techniques – Signal flow graphs.

UNIT-II
TIME RESPONSE:– Time domain specifications – Types of test input – I and II order system response – Error coefficients – Generalized error series – Steady state error. Effects of P, PI, PID Controllers.

UNIT-III
STABILITY AND ROOTLOCUS TECHNIQUE: Characteristic equation – Routh Hurwitz criterion, Root locus construction.

Unit IV
FREQUENCY RESPONSE: Correlation between frequency domain and time domain specifications, concept of gain and phase margin. Bode plot, Polar plot, Nyquist stability criterion – Determination of closed loop response from open loop response.

UNIT-V

STATE VARIABLE ANALYSIS: Concept of state variables – State models for linear and time invariant Systems – Solution of state and output equation in controllable canonical form – Concepts of controllability and observability

Text Books:

1. Modern Control Engineering, Katsuhiko Ogata, PEARSON, 1st Impression 2015.
2. Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International Publishers, 5th edition, 2007, Reprint 2012.

Reference Books:

1. Control Systems Engineering by A Nagoor Kani, CBS Publishers.
2. Automatic Control Systems, Farid Golnaraghi and Benjamin. C. Kuo, WILEY, 9th Edition, 2010.
3. Control Systems, Dhanesh N. Manik, CENGAGE Learning, 2012.
4. John J D'Azzo and C. H. Houpis , "Linear Control System Analysis and Design: Conventional and Modern", McGraw - Hill Book Company, 1988.

QUANTITATIVE APTITUDE AND REASONING
(Open Elective-I)

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objective:

- 1 .To study various concepts of athematic reasoning.
- To understand various concepts of Quantitative aptitude.

Course outcomes:

- Able to solve problems on number series, profit and loss ,ratio and proportion etc.
- Able to solve problems on time and work, pipes and cisterns, boats and streams etc.

Syllabus:

Unit-I

Divisibility and remainder rules of numbers: Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages. Alphabetical and miscellaneous series, Coding and decoding and Blood Relations.

Unit-II

Profit & loss, Simple interest and Compound interest: Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III

Ratio & proportions, Partnership, Alligation and mixtures and Ages: Data sufficiency, Inequalities and Decision making.

Unit-IV

Time and work, Pipes & cisterns and Time and distance. Syllogism, Statement and course of action and Statement and Assumption.

Unit-V

Boats and streams, Areas, Volume and surface areas. Statement and argument, Cause and effect and Drawing inference.

Text Books:

1. “Objective Arithmetic” by R.S. Agarwal, S. Chand Publications.
2. Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

Reference Books:

1. Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2. Quantitative Aptitude by Abhjit Guha.
3. Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

ELECTRICAL MACHINES-II LAB

B.Tech V Semester

L	T	P	C
0	0	3	1.5

Course Objectives:

- To control the speed of three phase induction motors.
- To determine /predetermine the performance three phase and single phase induction motors.
- To improve the power factor of single phase induction motor .
- To predetermine the regulation of three–phase alternator by various methods, find Xd/ Xqratio of alternator and asses the performance of three–phase synchronous motor.

Course Outcomes:

- Able to assess the performance ofsingle phase and three phase induction motors.
- Able to control the speed of three phase induction motor.
- Able to predetermine the regulation of three–phase alternator by various methods.
- Able to find the Xd/ Xqratio of alternator and asses the performance of three–phase synchronous motor.

Lists of Experiments

Any 10 of the Following experiments are to be conducted:

1. Brake test on three phase Induction Motor
2. No–load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance &m.m.f. Methods
4. Regulation of three–phase alternator by Portier triangle method
5. V and Inverted V curves of a three—phase synchronous motor.
6. Determination of X_d and X_q of a salient pole synchronous machine
7. Equivalent circuit of single phase induction motor
8. Speed control of induction motor by V/f method.
9. Efficiency of three phase alternator by loading with three phase induction motor.
10. Power factor improvement of single phase induction motor by using capacitors
11. Load test on single phase induction motor.
12. Measurement of sequence impedance of a three–phase alternator

ELECTRICAL MEASUREMENTS LAB

B.Tech V Semester

L	T	P	C
0	0	3	1.5

Course Objective:

- To understand the electrical parameters and calibration of voltmeter and Ammeter
- Calibration of wattmeter and energy meter
- Measurement of electrical characteristics of resistance, inductance and capacitance of circuits through appropriate methods.
- To understand testing of transformer oil.

Course Outcomes:

- Able to measure the electrical parameters voltage, current, power, energy and electrical characteristics of resistance, inductance and capacitance.
- Able to calibrate different measuring instruments
- Able to test transformer oil for its effectiveness.

Lists of Experiments

Any 10 of the Following experiments are to be conducted

1. Calibration and Testing of single phase energy Meter
2. Calibration of dynamometer wattmeter using phantom loading
3. Measurement of 3 phase reactive power with single phase wattmeter for balanced loading.
4. Calibration of LPF wattmeter by direct loading.
5. Calibration of Power factor meter
6. Measurement of Power by 3 Voltmeter and 3 Ammeter method.
7. Measurement of parameters of a Choke Coil using 3 Voltmeter and 3 Ammeter method.
8. Calibration of PMMC ammeter and voltmeter using Crompton D.C. Potentiometer
9. Measurement of resistance and Determination of Tolerance using Kelvin's double Bridge.
10. Capacitance Measurement using Schering bridge.
11. Inductance Measurement using Anderson bridge.
12. Dielectric oil testing using H.T test Kit.

PYTHON PROGRAMMING LAB

B.Tech V Semester

L	T	P	C
0	0	2	1

Lists of Experiments

Any 10 of the Following experiments are to be conducted

1. Write a program to perform various list of operations (eg: Arithmetic, logical, bitwise etc) in
   python.
2. Write a program to implement control flow statements.
3. Write a program implementing various predefined function of Lists, Sets, Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.
6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors.
9. Write a program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen vales and
    vectors, determinant for a matrix.
12. Write a program to use System, math etc packages.

CONSTITUTION OF INDIA

B.Tech V Semester

L	T	P	C
2	0	0	0

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of india and election commission of india.
- To understand the central and state relation financial and administrative.

Course outcomes:-

- Know the role of Election Commission apply knowledge
- Contrast and compare the role of Chief Election commissioner and Commissiononerate
- Analyze role of state election commission
- Evaluate various commissions of viz SC/ST/OBC and women

SYLLABUS

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi

2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

SEMESTER-VI

SYLLABUS

MICROPROCESSORS AND MICROCONTROLLERS

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course objectives:

- To understand the organization and architecture of 8086 Micro Processor
- To understand 8051 micro controller architecture
- To understand the programming principles for 8086 and 8051
- To understand the interfacing of MP with I/O as well as other devices
- To understand the applications of 8051 microcontroller

Course Outcomes:

- To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors.
- To be able to understand the addressing modes of microprocessors
- To be able to understand the micro controller capability
- To be able to program microprocessor and microcontroller
- To be able to interface microprocessor and microcontroller with other electronic devices

UNIT–I

Microprocessor Architecture: Introduction and evolution of Microprocessors– Architecture of 8086–Register Organization of 8086–Memory organization of 8086–pin diagram of 8086-General bus operation of 8086.

UNIT–II

Minimum and Maximum Mode Operations: Instruction set, Addressing modes– Minimum and Maximum mode operations of 8086–8086 Control signal interfacing–Read and write cycle timing diagrams.

UNIT–III

I/O Interface: 8255 PPI– Architecture of 8255–Modes of operation– Interfacing I/O devices to 8086 using 8255–Interfacing A to D converters– Interfacing D to A converters– Stepper motor interfacing – DMA controller (8257) – architecture– Interfacing 8257 DMA controller–Programmable Interrupt Controller (8259)–Command words and operating modes of 8259–Interfacing of 8259–Keyboard/display controller (8279)–Architecture–Modes of operation–Command words of 8279– Interfacing of 8279.

UNIT–IV

Introduction to 8051 Micro Controller: Overview of 8051 Micro Controller– Architecture–Register set–I/O ports and Memory Organization– Interrupts–Timers and Counters–Serial Communication.

UNIT– V:

Applications of Micro Controllers: Interfacing 8051 to LED's–Push button– Relay's and Latch Connections– Keyboard Interfacing– Interfacing Seven Segment Display–ADC and DAC Interfacing.

Text Books:

1. Microprocessors and Interfacing, Douglas V Hall, Mc–Graw Hill, 2nd Edition.
2. Ray and Burchandi, "Advanced Micro Processors and Interfacing", Tata McGraw Hill.
3. Kenneth J Ayala, "The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.

Reference Books:

1. R.S. Kaler, " A Text book of Microprocessors and Micro Controllers", I.K. International Publishing
House Pvt. Ltd.
2. Ajay V. Deshmukh, "Microcontrollers – Theory and Applications", Tata McGraw–Hill Companies –2005.
3. Ajit Pal, "Microcontrollers – Principles and Applications", PHI Learning Pvt Ltd, 2011.

SWITCH GEAR AND PROTECTION

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course Objective:

- To provide the basic principles and operation of various types of circuit breakers.
- To study the classification, operation and application of different types of electromagnetic protective relays.
- To explain protective schemes, for generator and transformers, various protective schemes used for feeders and bus bars.
- To explain the principle and operation of different types of static relays.
- To study different types of over voltages in a power system and principles of different protective schemes for insulation co–ordination.

Course Outcome:

- Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6 gas type.
- Ability to understand the working principle and operation of different types of electromagnetic protective relays.
- Students acquire knowledge of faults and protective schemes for high power generator and transformers and understand various types of protective schemes used for feeders and bus bar protection.
- Able to understand different types of static relays and their applications.
- Able to understand different types of over voltages and protective schemes required for insulation co–ordination.

SYLLABUS

UNIT-I

Circuit Breakers: Miniature Circuit Breaker(MCB)– Elementary principles of arc interruption– Restriking Voltage and Recovery voltages– Restriking phenomenon - RRRV– Average and Max.RRRV– Current chopping and Resistance switching– Introduction to oil circuit breakers–Description and operation of Air Blast– Vacuum and SF6 circuit breakers– CB ratings and specifications.

UNIT-II

Electromagnetic Protection: Relay connection – Balanced beam type attracted armature relay - induction disc and induction cup relays–Torque equation - Relays classification–Instantaneous– DMT and IDMT types– Applications of relays**:** Over current and under voltage relays– Directional relays– Differential relays and percentage differential relays– Universal torque equation–Distance relays**:** Impedance– Reactance– Mho and offset mho relays– Characteristics of Distance relays and comparison

UNIT-III

Static relays: Introduction to static relays and Static relay components

Generator Protection: Protection of generators against stator faults– Rotor faults and abnormal conditions– restricted earth fault and inter turn fault protection

UNIT IV

Transformer Protection: Protection of transformers**:** Percentage differential protection– Design of CT's ratio– Buchholz relay protection

Feeder and Bus bar Protection: Protection of lines**:** Over current Protection schemes – PSM,TMS - Numerical examples - Carrier current and three zone distance relay using impedance relays–Protection of bus bars by using Differential protection

UNIT-V

Protection against over voltage and grounding: Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc oxide lighting arresters– Insulation coordination– BIL– impulse ratio–Standard impulse test wave– volt-time characteristics– Grounded and ungrounded neutral systems–Effects of ungrounded neutral on system performance– Methods of neutral grounding**:** Solid– resistance–Reactance–Arcing grounds and grounding Practices.

Text Books:

1. Power System Protection and Switchgear by Badari Ram and D.N Viswakarma, TMH Publications
2. M.L.Soni, P.V.Gupta, U. S. Bhatnagar and A. Chakraborti,‖Power System Engineering‖, Dhanpat Rai& co. Pvt. Ltd., 2016.

Reference Books:

1. Sunil S Rao, ―Switchgear and Protection‖, Khanna Publishers, Latest Edition
2. C.L.Wadhwa, ―Electrical Power Systems‖, New Age international (P) Ltd, 2012.

OOPS THROUGH JAVA

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course Objectives:

- Focus on object oriented concepts and java program structure and its installation.
- Comprehension of java programming constructs, control structures in Java.
- Implementing Object oriented constructs such as various class hierarchies, interfaces and exception handling.
- Understanding of Thread concepts and I/O in Java.
- Being able to build dynamic user interfaces using applets and Event handling in java.
- Understanding of various components of Java AWT and Swing and writing code snippets using them.

Course Outcomes:

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

- Understand the principles of object oriented concepts. Define classes and objects by identifying real world entities, their properties and functionalities.
- Reuse the existing classes by using inheritance and understand the concepts of packages and exception handling.
- Make use of built-in classes in Java and understand the concept of thread.
- Develop user interfaces using applets, AWT and Event handling in java.
- Create portable GUI applictions using Swing components.

SYLLABUS:

UNIT-I: Introduction to OOP, procedural programming language vs object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector.

UNIT-II:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

Exception handling, importance of try, catch, throw, throws and finally block, user defined exceptions, Assertions.

UNIT-III:

Multithreading: Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-IV:

Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

UNIT-V:

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List, Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

TEXT BOOKS:

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.
3. JAVA for Beginners,4e,Joyce Farrell,Ankit R. Bhavsar,Cengage Learning.
4. Object oriented programming with JAVA,Essentials and Applications, Raj Kumar Bhuyya,Selvi,Chu,TMH.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1. Java Programming,K.Rajkumar.Pearson
2. Core Java,Black Book,R Nageswara rao,Wiley,Dream Tech
3. Core Java for Beginners,Rashmi Kanta Das,vikas.
   Object Oriented Programming Through java, P.Radha Krishna, Universities Press

MANAGEMENT SCIENCE

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To familiarize with the process of management and to provide basic insight into select contemporary management practices
- To provide conceptual knowledge on functional management and strategic management.

Course Outcome:

- After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior.
- The student will acquire insight on the concepts of Project management , strategic management and Contemporary management practices.

Unit I

Introduction to Management: Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization - Types of organization structure- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure

Unit II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

Unit III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager-Wage payment plans (Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

Unit IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).
Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis.

Unit V

Contemporary Management Practice: Basic concepts of MIS, MRP, Just in Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management ,Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, 'Management Science' Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, Management Science' TMH 2011.

References

1. Koontz & Weihrich: 'Essentials of management' TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011
5. Philip Kotler & Armstrong: Principles of Marketing, Pearson Publications
6. Biswajit Patnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Starategic Management, Cengage learning
8. Prem Chadha: Performance Management, Trinity Press(An imprint of Laxmi Publications Pvt. Ltd.)
Delhi 2015.
9. Anil Bhat& Arya Kumar : Principles of Management, Oxford University Press, New Delhi, 2015.

DESIGN AND ESTIMATION OF ELECTRICAL SYSTEMS

(Open Elective-II)

B.Tech VI Semester **L T P C**
Course Objective: **3 0 0 3**

- Domestic and Industrial wiring estimation
- Coasting and Contracting types
- Estimate the Transmission line based on IE Rules.
- Estimate the Overhead distribution and underground distribution systems materials and accessories based on IE Rules.

Course Outcomes:

- Prepare an estimate of quantity and cost of the material for a electrical project
- Prepare an estimating, costing and contracting electrical project
- Prepare detail estimate and costing of Residential and commercial Electrical Installations.
- Test Residential, commercial and Industrial Electrical Installation Prepare detail estimate and costing of a transmission line/Overhead and underground distribution project.
- Prepare estimates for repairs and maintenance of electrical devices and equipment.

SYLLABUS

UNIT-I

Electrical Wiring: Types of wires Different types of wiring system and wiring procedure Merits, demerits and comparison of different types of wiring, Different types and specifications of wiring materials, Accessories and wiring tools Domestic and industrial panel wiring I.E. rules for wiring, including Electricity supply act-1948 Different types of wiring circuits. Types of service connections.

Unit– II

Estimation and Costing of Domestic wiring: Layout for domestic Wiring, Load calculation, Cable selection Earthing Selection of switchgear. Overall Estimating and costing.

Unit– III

Estimation of Industrial wiring: Layout for industrial Wiring, Load calculation, Cable selection, Earthing, Selection of switchgear. Overall Estimating and costing.

Unit-IV

Estimation of Overhead Transmission lines: Transmission lines, Line supports, Factors governing height of pole, Conductor materials, size of conductor for overhead, Transmission line: cross arms, pole brackets and clamps, guys and stays, conductors configuration spacing and clearances, span lengths, overhead line insulators, insulator materials lightning arrestors, erection of supports, setting of stays, Earthling of lines, Guarding of overhead lines, Clearances of conductor from ground, Spacing between supports conductors, I.E. rules pertaining to LV transmission line. Estimate for 440 V, 3-phase, 4 wires or 3 wires overhead distribution system.

Unit- V

Estimation, Costing and Contracting: Estimation and estimation tools. Electrical Schedule of rates, catalogues, Survey and source selection, Recording estimates, Quantity and cost of material required. Purchase system, Purchase enquiry and selection of appropriate purchase mode, Comparative statement, Purchase orders, Payment of bills, Types of contract system. Tendering procedure and preparation of simple tender, Earnest Money Deposit, Security Deposit Schedule of rates (S.O.R.)

Text Books:

1. Electrical Design, estimating & Costing aina, K. B. and Bhattacharya,S.K
2. Electrical Estimating & costing Uppal, S L New Age International (p) New Delhi

Reference Books:

1. Electrical Installation Estimating & Costing Gupta, J.B. S. K. Kataria & Sons, New Delhi
2. Relevant IS Code for-service line connection, laying of cable, wiring installation NBC National Building Code-Vol-IV
3. IE. rules for wiring, Electricity supply act-1948. Bureau of Indian Standards Electricity supply act-1948

ENERGY AUDIT, CONSERVATION AND MANAGEMENT
(Open Elective-II)

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course Objective:

- To understand energy efficiency, scope, conservation and technologies.
- To design energy efficient lighting systems.
- To estimate/calculate power factor of systems and propose suitable compensation techniques.
- To understand energy conservation in HVAC systems.
- To calculate life cycle costing analysis and return on investment on energy efficient technologies.

Course Outcomes:

- Explain energy efficiency, conservation and various technologies.
- Design energy efficient lighting systems.
- Calculate power factor of systems and propose suitable compensation techniques.
- Explain energy conservation in HVAC systems.
- Calculate life cycle costing analysis and return on investment on energy efficient technologies.

SYLLABUS

UNIT-I

Basic Principles of Energy Audit and management: Energy audit – Definitions – Concept – Types of audit – Energy index – Cost index – Piecharts –Sankey diagrams – Load profiles – Energy conservation schemes and energy saving potential – – Principles of energy management – Initiating, planning, controlling, promoting, monitoring, reporting – Energy manager – Qualities and functions –Language – Questionnaire – Check list for top management.

UNIT-II

Lighting: Modification of existing systems – Replacement of existing systems – Priorities**:** Definition of terms and units – Luminous efficiency – Polar curve – Calculation of illumination level –Illumination of inclined surface to beam – Luminance or brightness – Types of lamps – Types of lighting – Electric lighting fittings (luminaries) – Flood lighting – White light LED and conducting Polymers – Energy conservation measures.

UNIT-III

Power Factor and energy instruments: Power factor – Methods of improvement – Location of capacitors – Power factor with nonlinear loads – Effect of harmonics on Power factor – Numerical problems. Energy

Instruments – Watt–hour meter – Data loggers – Thermocouples – Pyrometers – Lux meters– Tong testers – Power analyzer.

UNIT-IV

Space Heating and Ventilation: Ventilation – Air–Conditioning (HVAC) and Water Heating**:** Introduction – Heating of buildings – Transfer of Heat–Space heating methods – Ventilation and air–conditioning –Insulation–Cooling load – Electric water heating systems – Energy conservation methods.

UNIT-V

Economic Aspects and Financial Analysis: Understanding energy cost - Economics Analysis – Depreciation Methods – Time value of money – Rate of return – Present worth method – Replacement analysis – Life cycle costing analysis – Energy efficient motors (basic concepts) – Economics of energy efficient motors and systems.

Computation of Economic Aspects

Need of investment, appraisal and criteria - Calculation of simple payback period–Return on investment – Net present value – Internal rate of return – numerical examples – Power factor correction – Lighting – Applications of life cycle costing analysis – Return on investment – Numerical examples.

Text Books:

1. Hand Book of Energy Audit by Sonal Desai- Tata McGraw hill
2. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd–2nd edition, 1995

Reference Books:

1. Energy management by W.R. Murphy & G. Mckay Butter worth, Elsevierpublications. 2012
2. Electric Energy Utilization and Conservation by S C Tripathy, Tata McGraw hill publishing company Ltd. New Delhi.
3. Energy management by Paul o' Callaghan, Mc–Graw Hill Book company–1st edition, 1998.
4. Energy management hand book by W.C.Turner, John wiley and sons.
5. Energy management and conservation –k v

MICROPROCESSORS AND MICROCONTROLLERS LAB

B.Tech VI Semester

L	T	P	C
0	0	3	1.5

Course Objectives:

- To study programming based on 8086 microprocessor and 8051 microcontroller.
- To study 8086 microprocessor based ALP using arithmetic, logical and shift operations.
- To study modular programming using 8086 microprocessor.
- To study to interface 8086 with I/O and other devices.
- To study parallel and serial communication using 8051 microcontroller.

Course Outcomes:

- Will be able to write assembly language program using 8086 microprocessor based on arithmetic, logical, and shift operations.
- Will be able to do modular programming using 8086 micro processor.
- Will be able to interface 8086 with I/O and other devices.
- Will be able to do serial communication using 8051 micro controllers.

Lists of Experiments

Any 10 of the Following experiments are to be conducted

I. Microprocessor 8086 :

Introduction to MASM/TASM.

1. Arithmetic operation – Multi byte addition and subtraction, multiplication and division – Signed and unsigned arithmetic operation, ASCII – Arithmetic operation.
2. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
3. By using string operation and Instruction prefix**:** Move block, Reverse string Sorting, Inserting, Deleting, Length of the string, String comparison.
4. Modular Program: Procedure, Near and Far implementation, Recursion.
5. Interfacing 8255–PPI
6. Programs using special instructions like swap, bit/byte, set/reset etc.
7. Interfacing 8259 – Interrupt Controller.
8. Interfacing 8279 – Keyboard Display.
9. Stepper motor control using 8253/8255
10. Arithmetic operations using 8051..
11. Reading and Writing on a parallel port.
12. Timer in different modes.
13. Serial communication implementation.
14. Understanding three memory areas of 00 – FF (Programs using above areas). Using external interrupts.

POWER ELECTRONICS AND SIMULATION LAB

B.Tech VI Semester

L	T	P	C
0	0	3	1.5

Course Objectives:

- To study the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.
- To analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
- To understand the operation of PWM inverter and AC voltage regulator with resistive and inductive loads.
- To understand the working of Buck converter, Boost converter and inverters.
- To understand the working of Integrator, Differentiator circuits using op–amp and AC voltage controller

Course Outcomes: After completion, the student will be able to

- Study the characteristics of various power electronic devices and analyze gate drive circuits of IGBT.
- Analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
- Understand the operation of single phase AC voltage regulator with resistive and inductive loads.
- Simulate and understand the working of Buck converter, Boost converter, single–phase square wave inverter and PWM inverter
- Simulate and understand the working of Integrator, Differentiator circuits using op–amp and AC voltage controller

LIST OF EXPERIMENTS

PART A (hardware):

Any 5 out of 6 experiments are to be conducted

1. Study of Characteristics of Thyristor, MOSFET & IGBT
2. Design and development of a firing circuit for Thyristor.
3. Single -Phase Half controlled converter with R and RL load
4. Single -Phase fully controlled bridge converter with R and RL loads
5. Single -Phase AC Voltage Regulator with R and RL Loads
6. Single -phase PWM inverter with sine triangle PWM technique

PART B (simulation):

Any 5 out of 6 experiments are to be conducted

7. Simulation of single phase full converter using RL and RLE loads
8. Simulation of three phase full converter using RL Load
9. Simulation of Boost and Buck converters
10. Simulation of single phase inverter with PWM control
11. Simulation of Integrator & Differentiator circuits using op–amp
12. Simulation of AC voltage controller using RL load

OOPS THROUGH JAVA LAB

B.Tech VI Semester

L	T	P	C
0	0	2	1

Course Objective:

- To understand the behaviour of primitive data types, object references, and arrays.
- To implement interfaces, inheritance and polymorphism as programming techniques
- To implement exceptions handling

Course Outcomes:

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

- Understand the behavior of primitive data types, object references, and arrays.
- Implement Java classes from specifications
- Implement interfaces, inheritance, and polymorphism as programming techniques
- Apply exceptions handling.

Lists of Experiments

Any 10 of the Following experiments (Exercise) are to be conducted

Exercise - 1 (Basics)
a). Write a JAVA program to display default value of all primitive data type of JAVA
b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)
a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
b). Write a JAVA program to sort for an element in a given list of elements using bubble sort
(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.
(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)
a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.
b). Write a JAVA program to implement constructor.
Exercise - 4 (Methods)
a). Write a JAVA program to implement constructor overloading.
b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)
a). Write a JAVA program to implement Single Inheritance.
b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)
a). Write a JAVA program give example for "super" keyword.
b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)
a).Write a JAVA program that describes exception handling mechanism
b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)
a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)
a). Write a JAVA program Illustrating exception handling keywords.
b). Write a JAVA program for creation of Java Built-in Exceptions
c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)
a). Write a JAVA program that creates threads by extending Thread class.
b). Write a program illustrating **isAlive** and **join ()**
c). Write a Program illustrating Daemon Threads.
Exercise - 11 (Threads continuity)
a).Write a JAVA program Producer Consumer Problem
b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)
a). Write a JAVA program illustrate class path
b). Write a case study on including in class path in your os environment of your package.
c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)
a).Write a JAVA program to paint like paint brush in applet.
b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)
a).Write a JAVA program that display the x and y position of the cursor movement using Mouse.
b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

SEMESTER-VII

SYLLABUS

DIGITAL SIGNAL PROCESSING

L	T	P	C
3	0	0	3

B.Tech VII Semester

Course Objectives: This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous-time and discrete time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.

Course Outcomes: On completion of this subject, the student should be able to:

- Perform time, frequency, and Z -transform analysis on signals and systems.
- Understand the inter-relationship between DFT and various transforms.
- Understand the significance of various filter structures and effects of round off errors.
- Design a digital filter for a given specification.
- Understand the fast computation of DFT and appreciate the FFT processing.

SYLLABUS

UNIT - I

Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, conversion of continuous to discrete signal, Normalized Frequency, Linear Shift Invariant Systems, Stability, and Causality, linear differential equation to difference equation, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

UNIT - II

Realization of Digital Filters: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

UNIT - III

Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform. Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N.

UNIT - IV

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

UNIT - V

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCES:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

POWER SYSTEM OPERATION AND CONTROL

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objective:

- Calculation of power flow in a power system network using various techniques.
- Able to deal with short circuit analysis and analysis of power system for steady state and transient stability.
- To learn about load characteristics and economic operations of Power Systems.
- To know about single area and two area load frequency control.

Course Outcomes:

- Develop Power flow solutions using iterative techniques.
- Compute symmetrical and unsymmetrical fault analysis of given power system.
- Perform stability analysis of a power system.
- Analyse the performance of generators in thermal power station for economical operation.
- Analyse Load frequency control of power system.

SYLLABUS

UNIT-I

Power Flow Studies: Per unit representation, Y bus formation by Direct inspection method, Power flow solution using Gauss Seidel Method, Newton Raphson Method in Polar Co-ordinates form, Decoupled and Fast Decoupled Methods, Algorithms. (problems upto 3 bus system only).

UNIT-II

Short Circuit Analysis:

Symmetrical fault analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors. Symmetrical Component Theory, Positive, Negative and Zero sequence components: Positive, Negative and Zero sequence Networks.

Unsymmetrical fault analysis: LG, LL, LLG faults with and without fault impedance.

UNIT-III

Power System Stability Analysis: Classification of power system stability, Power system stability problem-Power angle curve-stability limits, Derivation of Swing Equation, Analysis of steady state stability, Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Methods to improve Stability, Introduction to Voltage stability.

UNIT-IV

Economic operation of Power Systems: Optimal operation of Generators in Thermal power stations, Heat rate curve, Cost Curve, Incremental fuel and Production costs, Input–output characteristics. Optimum generation allocation with & without transmission losses, Loss Coefficients.

UNIT-V

Load Frequency control: Definitions of Control area, **Single area control:** Block diagram representation of an isolated power system, Steady state analysis, Dynamic response, uncontrolled case. Proportional plus Integral control of single area and its block diagram representation,

Two area control: uncontrolled case and controlled case, tie-line bias control.

Text Books:

1. Modern Power system Analysis–by I.J.Nagrath & D.P.Kothari: Tata McGraw-Hill Publishing Company, 2nd edition.
2. C.L. Wadhwa, "Electrical Power Systems", New Age International Publishers, 7th Edition, 2017.
3. Power System Analysis by Hadi Saadat –TMH Edition.
4. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill
5. Power Generation Operation and Control -Wood and Wollenberg, Wiley Publishers.
6. Power Systems Operation and Control –Chakravarthi, Halder.

Reference Books:

1. Computer Methods in Power Systems, Stagg El –Abiad & Stags.
2. Power System Analysis–by A.R.Bergen, Prentice Hall, Inc.
3. Computer Analysis of Power Systems –J Arrillaga.
4. Power System Stability –Vol-1, Kimbark, IEEE Press.
5. Analysis of Faulted Power Systems –P M Anderson, IEEE Press.
6. Power System Stability and Control –Prabha Kundur, McGraw Hill Publishers.

ELECTRIC VEHICLES
(Professional Elective-I)

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To study the different drive train configurations of electric vehicles
- To propose the various propulsion and energy storage systems for EHVs
- To know the sizing of propulsion motors and other systems involved in EH vehicles
- To carry out different design case studies of EHv and BEVs

Course Outcomes:

At the end of the course, student will be able to:

- Assess the performance, societal and environmental impact of EHVs having known their past history
- Implement various drive train topologies and control strategies in Electric and Hybrid vehicles
- Recommend, Design/Size and Control different electric propulsion units and other components of EHVs and BEVs
- Appropriately select the energy storage system and strategize its management in EHVs

SYLLABUS

UNIT I:

Introduction to Electric Vehicles: History of electric vehicles (EV) and hybrid electric vehicle (EHV), need and importance of EV and HEV, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies, Power/energy supplies requirements for EV/HEV applications, vehicle power source characterization, and transmission characteristics.

UNIT-II:

Hybrid Electric Drive-trains: Basic architecture and concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.

UNIT-III:

Electric Propulsion Unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Induction Motor drives, Permanent Magnet Motor drives, and Switch Reluctance Motor drives, drive system efficiency.

UNIT-IV:

Battery Energy Storage Systems: Battery Basics - Lead-Acid Battery -Cell Discharge Operation - Cell Charge Operation-Construction-Battery Parameters - Battery Capacity-Discharge Rate - State of Charge- State of Discharge- Depth of Discharge-Technical Characteristics - Practical Capacity -Battery Energy -Constant Current Discharge -Specific Energy - Battery Power -Specific Power -Batteries for EV applications.

UNIT-V:

Modelling of EV/HEV: Modelling and analysis of EV/HEV drive train sizing of motor, and design of traction power electronics, various vehicle subsystems.

TEXT BOOKS:

1. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2010.
2. Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2009.
3. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.

REFERENCES:

1. Jefferson, C.M., Barnard and R.H., Hybrid Vehicle Propulsion, WIT Press, Boston, 2002
2. Jack Erjavec and Jeff Arias, “Hybrid, Electric and Fuel Cell Vehicles”, Cengage Learning, 2012
3. SerefSoylu “Electric Vehicles - The Benefits and Barriers”, InTech Publishers, Croatia, 2011
4. Jack Erjavec and Jeff Arias, “Alternative Fuel Technology – Electric, Hybrid and Fuel Cell Vehicles”, Cengage Learning Pvt. Ltd., New Delhi, 2007
5. Seth Leitman, “Build Your Own Electric Vehicle” McGraw hill, New York, USA, 2013

RENEWABLE ENERGY SOURCES
(Professional Elective-I)

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objective:

- To give sufficient knowledge about the promising new and renewable sources of energy
- Explain the concept of various forms of renewable energy
- Learn the present energy scenario
- Analyse the environmental aspects of renewable energy resources.

Course Outcomes:

- Know the need of various renewable energy systems
- understand the concepts of bio-energy,
- Acquire the knowledge of OTEC, tidal,
- Acquire the knowledge of geothermal and **Alternative energy sources**

SYLLABUS

UNIT-I

Introduction: Introduction to energy sources, reserves and estimates, global energy scenario, renewable energy -environment implications, global warming and climate change, limitations of conventional energy sources, classification of non-conventional energy sources - solar energy, wind energy, bio-energy, Ocean Thermal Energy Conversion (OTEC), tidal, geothermal and hydro.

UNIT-II

Bio-energy: Biomass and its sources, energy plantation, production of fuel wood, bio-conversion processes, bio-gas, bio-diesel and ethanol production and utilization, thermo-chemical processes, biomass gasification, process, types of reactors, utilization of producer gas for thermal and electricity generation.

UNIT-III

Ocean thermal energy conversion, tidal, geothermal: Tidal energy, wave energy, data, technology options; open and closed *Ocean thermal energy conversion* cycles, geothermal energy sources, power plant and environmental issues.

UNIT-IV

Fuel Cells: Hydrogen generation-storage, transport and utilization, applications, power generation. Fuel cells-Technologies, types, economics and power generation.

UNIT-V

Solar Energy Storage and Applications:

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications-solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

Text Books:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers, 2006
2. Renewable Energy Resources – Twidell&Wier, CRC Press(Taylor & Francis), 2012
3. *Y. W. B. Charles, B.H. Essel, ―Biomass Conversion and Technology‖*, John Wiley, Latest Edition

Reference Books:

1. Renewable energy resources by G. N. Tiwari, M. K. Ghosal, Alpha Science International, 2005.
2. Renewable Energy Technologies by R. Ramesh, K. Uday Kumar, M. Anandakrishnan, Narosa Publishing House, 1997
3. Non-Conventional Energy Systems by K Mittal, A. H. Wheeler Publishing Company Limited, 01-Jan-1999.
4. Renewable energy sources and emerging technologies by D.P.Kothari,K.C.Singhal, P.H.I.
5. Godfrey Boyle, ―Renewable Energy- Power for a Sustainable Future‖, Oxford University Press, U.K.,
6. Twidell, J.W. & Weir, A., ―Renewable Energy Sources‖, E.F.N Spon Ltd., UK.

SMART GRID TECHNOLOGIES
(Professional Elective-I)

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objective:

- To understand various aspects of smart grid
- To study various smart transmission and distribution technologies
- To appreciate distribution generation and micro grids
- To know the Elements of communication and networking for smart grid

Course Outcomes:

- Understand technologies for smart grid
- Appreciate the smart transmission as well distribution systems
- Realize the distribution generation and
- Know the Elements of communication and networking for smart grid

SYLLABUS

UNIT – I
Introduction to Smart Grids: Definition need for smart grids, smart grid conceptual model, Difference between conventional & smart grid, Role of Smart grids. Smart grid economic and environmental benefits

UNIT – II:
Monitoring and control for transmission system: Smart Substations and their automation, Supervisory control and data acquisition (SCADA), energy management system (EMS), phasor measurement units (PMU), Wide area measurement systems (WAMS)

UNIT – III
Smart Distribution Technologies: Distribution automation, automated meter reading (AMR), fault location isolation and service restoration (FLISR), Outage Management Systems (OMS), Energy Storage, Renewable Integration

UNIT – IV
Micro grids and Distributed energy resources: Concept of micro grid, need & applications of micro grid, formation of micro grid, issues of interconnection, protection & control of micro grid.
Distributed energy resources (DERs): Small scale distributed generation, Distributed Generation Technology, Micro turbines, Fuel Cells, Solar Photovoltaic, Solar thermal, Wind power, Advantages and disadvantages of DG.

UNIT – V
Elements of communication and networking:

Local Area Network (LAN) - House Area Network (HAN) - Wide Area Network (WAN) - Broadband over Power line (BPL) - IP based Protocols - Basics of web service and CLOUD Computing, Cyber Security for Smart Grid.

Text Books:

1. Clark W Gellings, "The Smart Grid, Enabling Energy Efficiency and Demand Side Response"- CRC Press, 2009.
2. Jean Claude Sabonnadière, Nouredine Hadjsaïd, "Smart Grids", Wiley-ISTE, IEEE Press, May 2012
3. Tony Flick and Justin Morehouse, "Securing the Smart Grid", Elsevier Inc.

Reference Books:

1. James Momoh, "Smart Grid: Fundamentals of Design and Analysis" – Wiley, IEEE Press, 2012.
2. Janaka Ekanayake, Kithsiri Liyanage, Jianzhong. Wu, Akihiko Yokoyama, Nick Jenkins, "Smart Grid: Technology and Applications"- Wiley, 2012.
3. Stuart Borlase , Smart Grid: Infrastructure, Technology and Solutions, CRC Press 2012.
4. Mini S. Thomas, John D McDonald, Power System SCADA and Smart Grids, CRC Press, 2015
5. Kenneth C.Budka, Jayant G. Deshpande, Marina Thottan, Communication Networks for Smart Grids, Springer, 2014.
6. Ali K., M.N. Marwali, Min Dai, "Integration of Green and Renewable Energy in Electric Power Systems", Wiley.

PROGRAMMABLE LOGIC CONTROLLERS
(Professional Elective-II)

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To introduce the basic concepts of programmable logic controllers and its applications.
- To familiarize the students in programming formats and construction of PLC ladder diagrams.
- To Study PLC functions, Data handling functions and controlling of two axes and three axes Robots with PLC.
- To Study Analog PLC operation and different examples.

Course Outcomes:

After completion of this course, Students will be able to

- Describe the Characteristics of Registers, module addressing, holding registers, input registers, output registers and determine its importance in Ladder diagram.
- Apply the knowledge of programming formats for construction of PLC ladder diagrams in Boolean algebra systems.
- Develop ladder diagrams for process control.
- Describe the Analog modules and systems, Analog signal processing, multi bit data processing.
- Understand various Industrial applications of PLC.

SYLLABUS

UNIT-I

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming equipment, programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

UNIT-II

PLC Programming & Registers : Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation. Digital logic gates, programming in the Boolean algebra system, conversion examples. Ladder diagrams for process control: Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system. Characteristics of Registers, module addressing, holding registers, input registers, output registers.

UNIT-III

PLC Functions: PLC Functions: Timer functions and Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions.

UNIT-IV

Data Handling Functions: Data handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR and Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two axes and three axis Robots with PLC, Matrix functions.

UNIT-V

Analog PLC Operation: Analog modules and systems, Analog signal processing, multi bit data processing, analog output application examples, PID principles, position indicator with PID control, PID modules, PID tuning, PID functions.

Text Books:

1. Programmable Logic Controllers – Principle and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI.
2. Programmable Logic Controllers – Programming Method and Applications by JR. Hackworth and F.D Hackworth Jr. – Pearson, 2004.

Reference Books:

1. Programmable Logic Controllers Hardware and Programming by Max Rabiee Goodheart-Wilcox.
2. Programmable Logic Controllers by Frank D. Petuzeela McGraw-Hill.
3. Industrial Automation and Process control by Jon Stenerson Prentice-Hall.

AI TECHNIQUES
(Professional Elective-II)

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To study various methods of AI
- To study the models and architecture of artificial neural networks.
- To study the ANN paradigms**.**
- To study the fuzzy sets and operations and fuzzy logic systems.
- To study the applications of AI.

Course Outcomes

- Compare human brain and computer and learn different AI Techniques
- Understand the basic concepts, models training algorithms and applications of artificial neural networks CO 3
- Explain the basic concepts of fuzzy and classical sets and fuzzy logic system components
- Model an intelligent system from the concepts of NN & Fuzzy logic and understand their applications

SYLLABUS

UNIT–I

Fundamentals of Neural Networks: Introduction to artificial intelligence systems, Humans and Computers. Organization of the Brain – Biological Neuron – Biological and Artificial neuron Models, MC Culloch-pitts neuron model, Activation functions, Learning process, Learning rules, neural network architectures- Single-layer feed-forward networks: – Perceptron, Learning algorithm for perceptron- limitations of Perceptron model

Unit–II

Multilayer feed forward Neural Networks: Derivation of Back propagation (BP) Training, Radial Basis Function (RBF) Neural Network – Kohonen Self Organising feature Map (KSOM). Architecture of Hopfield Network

UNIT – III

Classical and Fuzzy Sets: Introduction to classical sets – properties – Operations and relations – Fuzzy sets – Membership – Uncertainty – Operations – Properties – Fuzzy relations – Cardinalities – Membership functions.

Fuzzy Logic System Components: Fuzzification – Membership value assignmen – Development of rule base and decision making system – Defuzzification to crisp sets – Defuzzification methods – Basic hybrid system.

UNIT IV

Genetic Algorithms and Genetic modeling: Introduction-Encoding – fitness function-Reproduction operators – Genetic Modeling – genetic operators – crossover – single site

crossover – two point crossover – multipoint crossover – uniform crossover – matrix crossover – crossover rate – inversion & deletion – mutation operator – mutation – mutation rate – Bit wise operator – Generational Cycle – Convergence of Genetic Algorithm

UNIT–V:

Application of AI techniques: Load forecasting – Economic load dispatch – Reactive power control – Speed control of dc and ac motors.

Text Books:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by S.Rajasekaran and G.A. Vijayalakshmi Pai – PHI Publication.
2. Fuzzy logic with fuzzy applications- by T.J. Ross, TMH.

Reference Books:

1. Introduction to Artificial Neural Systems – Jacek M. Zurada, Jaico Publishing House, 1997.
2. Fundamentals of Neural Networks Architectures, Algorithms and Applications - by laurene Fausett, Pearson.
3. Neural Networks, Algorithms, Applications and programming Techniques by James A. Freeman, David M. Skapura.
4. Introduction to Neural Networks using MATLAB 6.0 by S N Sivanandam, S Sumathi, S N Deepa TMGH

SPECIAL ELECTRICAL MACHINES
(Professional Elective-II)

B.Tech VII Semester

L	T	P	C
3	0	0	3

Course Objective:

- To explain theory of operation and control of switched reluctance motor.
- To explain the performance and control of stepper motors, and their applications.
- To describe the operation and characteristics of permanent magnet dc motor.
- To distinguish between brush dc motor and brush less dc motor**.**
- To explain the theory of travelling magnetic field and applications of linear motors.

Course Outcomes:

The student should be able to

- Distinguish between brush dc motor and brush less dc motor**.**
- Explain the performance and control of stepper motors, and their applications.
- Explain theory of operation and control of switched reluctance motor.
- Explain the theory of travelling magnetic field and applications of linear motors.
- Understand the significance of electrical motors for traction drives.

SYLLABUS

Unit I

Stepper Motors: Classification and construction details of stepper motors – Hybrid and Variable Reluctance Motor (VRM) - Construction and principle of hybrid type synchronous stepper motor – Different configuration for switching the phase windings control circuits for stepper motors – Open loop and closed loop control of stepper motors – Applications of stepping motors.

Unit II

Switched Reluctance Motors: Construction – Comparison of conventional and switched reluctance motors –Torque producing principle and torque expression – Different converter configurations for SRM – Drive and power circuits for SRM – Position sensing of rotor – Applications of SRM.

Unit III

Brushless DC Motor: Construction – Principle of operation of BLDM – sensing and logic scheme, basic drive circuit, power converter circuit, transient analysis Theory of brushless DC motor as variable speed synchronous motor. Torque and EMF equations – Torque speed characteristics – Performance and efficiency.

UNIT-IV

Linear motors: Linear induction motor: Construction– principle of operation– applications. Linear synchronous motor: Construction – principle of operation– applications.

Unit V

Electric Motors for traction drives: AC motors– DC motors –Single sided linear induction motor for traction drives – Comparison of AC and DC traction.

Text Books:

1. Special electrical Machines, K.VenkataRatnam, University press, 2009, New
2. "Linear Electric Motors: Theory, Design and Practical application" , Naser A and Boldea I, Prentice Hall Inc, New Jersey, 1987.

Reference Books:

1. Generalized Theory of Electrical Machines – PS Bhimbra, Khanna Publishers.
2. "Brushless Permanent Magnet and Reluctance Motor Drives" , Miller T.J.E. Clarendon Press, Oxford, 1989.
3. Electric Machines – Theory, operation, Applications and Control - Charles I. Hubert – Pearson Publications.

DIGITAL SIGNAL PROCESSING LAB

B.Tech VII Semester

L	T	P	C
0	0	3	1.5

Course Objectives: Students undergoing this course, are expected to

- Analyze the Discrete Time Signals and Systems
- Know the importance of FFT algorithm for computation of Discrete Fourier Transform
- Understand the various implementations of digital filter structures
- Learn the FIR and IIR Filter design procedures

Course Outcomes: After undergoing the course, students will be able to

- Apply the difference equations concept in the analyzation of Discrete time systems
- Use the FFT algorithm for solving the DFT of a given signal
- Design a Digital filter (FIR&IIR) from the given specifications
- Realize the FIR and IIR structures from the designed digital filter.

Lists of Experiments

Any 10 of the Following experiments are to be conducted

1. Generation of basic sequences like impulse, unit step, ramp. Sinusoidal, co-sinusoidal, exponentially growing and decaying sequences.
2. Finding Power and Energy of a given signal
3. Verification of linear convolution.
4. Verification of circular convolution.
5. DFT of an N-point sequence
6. IDFT of an N-point sequence
7. N-point FFT algorithm
8. Frequency response of IIR low pass and high pass Butterworth filters
9. Frequency response of IIR low pass and high pass Chebyshev filters
10. Frequency response of FIR low pass filter using Rectangular and Hamming Windows
11. MATLAB program to generate sum of sinusoidal signals.
12. MATLAB program to find frequency response of analog filter.

POWER SYSTEMS AND SIMULATION LAB

B.Tech VII Semester

L	T	P	C
0	0	3	1.5

Course Objective:

To impart the practical knowledge of functioning of various power system components and determination of various parameters and simulation of load flows, transient stability, LFC and Economic dispatch.

Course Outcomes:

- Students are able to determine parameters of transmission line.
- Students are able to understand the concept of fault analysis of alternator.
- Students are able to check the dielectric strength of transformer oil.
- Students are able to write the program for analysing energy management systems functions at load dispatch centre.

Lists of Experiments

Any 10 of the Following experiments are to be conducted

1. Sequence impedances of 3 phase Transformer.
2. Sequence impedances of 3 phase Alternator by Fault Analysis.
3. Sequence impedances of 3 phase Alternator by Direct method.
4. ABCD parameters of the single phase Transmission line.
5. Power Angle Characteristics of 3phase Alternator with infinite bus bars.
6. Dielectric strength of Transformer oil.
7. Calibration of Tong Tester.
8 Load flow studies using Gauss-seidel method
9. Load flow studies using N-R method.
10. Transient Stability Analysis using Swing curve.
11. Load frequency control without control.
12. Load frequency control with PI control.
13. Economic load dispatch without losses.
14. Economic load dispatch with losses.

SUMMER INTERNSHIP/ MINI PROJECT

B.Tech VII Semester

L	T	P	C
0	0	0	1

SEMESTER- VIII

SYLLABUS

UTILIZATION OF ELECTRICAL ENERGY

	L	T	P	C
B.Tech VIII Semester	**3**	**0**	**0**	**3**

Course Objectives:

- To understand the operating principles and characteristics of traction motors with respect to speed, temperature, loading conditions.
- To acquaint with the different types of heating and welding techniques.
- To study the basic principles of illumination and its measurement.
- To understand different types of lightning system including design
- To understand the basic principle of electric traction including speed–time curves of different traction services and calculation of different parameters.

Course Outcomes:

- Able to identify a suitable motor for electric drives and industrial applications
- Able to identify most appropriate heating or welding techniques for suitable applications.
- Able to understand various level of illuminosity produced by different illuminating sources.
- Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.
- Able to determine the speed/time characteristics of different types of traction motors and estimate energy consumption levels

SYLLABUS

UNIT-I
Electric Drives: Selection of motor, steady state and transient characteristics, Applications of electric drives, Types of industrial loads- continuous–Intermittent and variable loads.

UNIT-II:
Electric Heating and Welding: Advantages and methods of electric heating–Resistance heating, induction heating and dielectric heating. Resistance welding and arc welding, Electric welding equipment.

UNIT-III
Illumination : Introduction, terms used in illumination, Laws of illumination, Sources of light, Mercury Vapor lamps and Sodium Vapor lamps, Discharge lamps, LED lamps, Types of lighting, flood lighting, LED lighting, street lighting.

UNIT- IV

Electric Traction - I: Review of existing electric traction systems in India– Special features of traction motor– Mechanics of train movement–Speed– time curves for different services – Trapezoidal and quadrilateral speed time curves-High speed transportation trains.

UNIT-V

Electric Traction – II: Calculations of tractive effort– power –Specific energy consumption for given run–Effect of varying acceleration and braking retardation–Adhesive weight and braking, retardation adhesive weight and coefficient of adhesion–Principles of energy efficient motors-Modern traction motors.

Text Books:

1. Utilization of Electric Energy – by E. Openshaw Taylor, Orient Longman.
2. Art & Science of Utilization of electrical Energy – by Partab, DhanpatRai&Sons.

Reference Books:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers, 1996.
2. Generation, Distribution and Utilization of electrical Energy – by C.L. Wadhwa, New Age International (P) Limited, Publishers, 1997.

DIGITAL CONTROL SYSTEMS
(Professional Elective-III)

B.Tech VIII Semester

L	T	P	C
3	0	0	3

Course Objective:

- To understand the concepts of digital control systems and assemble various components associated with it.
- To represent the discrete–time systems in state–space model and evaluation of state transition matrix
- To examine the stability of the system using different tests.
- To study the conventional method of analyzing digital control systems in the w–plane.
- To study the design of state feedback control by "the pole placement method."

Course Outcomes:

- Learn the advantages of discrete time control systems and the "know how" of various associated accessories
- Understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems)
- The stability criterion for digital systems and methods adopted for testing the same are explained
- Finally, the conventional and state space methods of design are also introduced

SYLLABUS

UNIT-I

SIGNAL PROCESSING: Introduction to analog and digital control systems – Advantages of digital systems – Typical examples – Signals and processing – Frequency domain characteristics of zero order hold – z–Transforms – Solving of difference equations.

UNIT-II

STATE SPACE ANAYSIS: State space representation of discrete time systems – State transition matrix and methods of evaluation – Discretization of continuous Time state equations – Concepts of controllability and observability – Tests(without proof)

UNIT-III

STABILITY ANALYSIS: Mapping between the s–Plane and the z–Plane – Primary strips and Complementary strips – Stability criterion – Modified Routh's stability criterion and Jury's stability test.

UNIT-IV

DESIGN OF DISCRETE TIME CONTOL SYSTEMS: Transient and steady state specifications – Design using frequency response in the w–plane for lag and lead compensators – Root locus technique in the z–plane.

UNIT-V

STATE FEEDBACK CONTROLLERS: Design of state feedback controller through pole placement – Necessary and sufficient conditions – Ackerman's formula.

Text Books:

a. Discrete–Time Control systems – K. Ogata, Pearson Education/PHI, 2nd Edition.
b. Digital Control and State Variable Methods by M.Gopal, TMH, 4th Edition.

Reference Books:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.

ELECTRICAL DISTRIBUTION SYSTEMS
(Professional Elective-III)

L	T	P	C
3	0	0	3

B.Tech VIII Semester

Course Objective:

- To study the Load characteristics and corresponding factors.
- To understand about substations and design the distribution systems.
- To study about distribution feeders and determination of voltage drop and power loss calculations.
- To study the distribution system protection and its coordination.
- To model the capacitor bank for power factor improvement and study about voltage control equipment.

Course Outcomes:

- Able to understand the daily load curve and finding different factors for economical operation.
- Able to understand the different substation equipment and design of distribution systems.
- Able to understand the distribution feeders, voltage drop and power loss calculations.
- Able to understand the different protective devices and how to coordinate them for complete protection.
- Able to modelling the capacitor banks for improving power factor and understanding about voltage control.

SYLLABUS

UNIT-1

General Concepts: Introduction to distribution systems - Distribution system losses – Coincidence factor – Contribution factor loss factor – Numerical Problems – Load Modelling and Characteristics – Relationship between the load factor and loss factor – Classification and characteristics of loads (Residential, commercial, Agricultural and Industrial).

UNIT – II

Substations : Location of substations: Rating of distribution substation – Service area with'n'primary feeders –Benefits and methods of optimal location of substations. Distribution Feeders Design Considerations of distribution feeders: Radial and loop types of primary feeders –Voltage levels – Feeder loading – Basic design practice of the secondary distribution system.

UNIT – III

System Analysis : Voltage drop and power loss calculations: Derivation for voltage drop and power loss in lines – Uniformly distributed loads and non-uniformly distributed loads – Numerical problems – Three phase balanced primary lines. Load flow analysis: forward/backward – direct approach.

UNIT – IV

Protective devices and Coordination: Objectives of distribution system protection –Time current characteristics – Protective devices**:** Principle of operation of fuses – Circuit reclosures

– Line sectionalizes and circuit breakers, Modulated case circuit breakers, Earth leakage circuit breakers – Protection schemes of parallel & Ring main feeders.

UNIT – V

Power Factor and Voltage control: Capacitive compensation for power factor control – Different types of power capacitors –Application and modelling of capacitor banks– Power factor correction – Capacitor allocation – Economic justification – Procedure to determine the best capacitor location. Voltage Control: Equipment for voltage control – Effect of series capacitors – Effect of AVB/AVR –Line drop compensation.

Text books:

1. Electric Power Distribution System Engineering, Turan Gonen, CRC press, Taylor & Fracis Group, 2nd edition.
2. J. J. Burke "Power Distribution Engineering: Fundamentals and Applications", CRC Press, 1994.

Reference books:

1. Electrical Distribution Systems by Dale R.Patrick and Stephen W.Fardo, CRC press
2. Electric Power Distribution – by A.S. Pabla, Tata McGraw–hill Publishing Company, 4th edition, 1997.
3. Electrical Power Distribution Systems by V. Kamaraju, Right Publishers.

POWER ELECTRONIC CONTROL OF ELECTRIC DRIVES
(Professional Elective-III)

B.Tech VIII Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the concept of drive and multi-quadrant operation of drive.
- It covers in detail the basic and advanced speed control techniques using power electronic converters that are used in industry.
- To understand the operation of Rectifier and Chopper fed DC drives.
- Describes the slip power recovery schemes in induction motors and operation of AC drives.

Course Outcomes:

Upon the completion of this course, the student will be able to

- Identify different electric drive system.
- Understand the operation of rectifier fed DC drives, chopper fed DC drives and closed loop control of DC motor.
- Analyse the slip power recovery schemes of Induction motor and speed control of converter fed induction motor & synchronous motor.
- Evalute the performance of speed control of synchronuous motor by CSI and VSI.

SYLLABUS

Unit I

Basics of Electric Dives: Definition, Advantages and applications of drives, Components of electric drive system, Difference between DC and AC drives, Multi quadrant operation of drive, fundamental torque equation and components of torque, load equalization, Speed control methods of DC motors and Induction motor, Electric Braking.

Unit II

Rectifier Control of DC Motor Drives: Single Phase Fully controlled converters connected to DC separately excited motor and DC series motor – Continuous & Discontinuous current operation – voltage and current waveforms – Speed Torque expressions – Speed Torque Characteristics.

Unit III

Chopper Control of DC Motor Drives: Chopper controlled DC separately excited motor and DC series motor – Continuous current operation – voltage and current waveforms – Speed Torque expressions – Speed Torque characteristics, Closed loop control of DC drive (Only Block Diagram).

Unit IV

Control of Induction Motors: Variable voltage control of Induction motor by AC voltage controller, Variable frequency control of Induction motor – waveforms – Speed Torque characteristics, Slip power recovery schemes – Static Kramer Drive – Static Scherbius Drive.

Unit V

Control of Synchronous Motors: Separate control & self-control of synchronous motors – Operation of self-controlled synchronous motors by VSI and Load commutated CSI fed Synchronous Motor – Operation – Waveforms – Speed Torque characteristics.

Text Books:

1. Fundamentals of Electrical Drives by G.K.Dubey, Second Edition, 2002.
2. Power Electronics: Circuits, Devices and Applications by M.H.Rashid, Third Edition, 2009.
3. P.S. Bimbhra, ― Power Electronics‖, 4th Edition, Khanna publishers. 2010

Reference Books:

1. Power Electronics by M.D.Singh and K.B.Khanchandani, Second Edition, 2017.
2. Modern Power Electronics and AC Drives by Bimal K Bose, 2005.
3. Thyristor Control of Electric Drives by Vedam Subramanyam, Tata McGraw-Hill Publications,
2008.

HVDC & FACTS
(Professional Elective-IV)

L	T	P	C
3	0	0	3

B.Tech VIII Semester

Course Objective:

- To Understand basic concepts of HVDC Transmission
- To analyze the converter configuration.
- To Know the control of converter and HVDC Transmission.
- To Understand the basic concepts of FACTS.
- To Know the operation of different FACTS devices

Course Outcomes:

- Learn different types of HVDC levels and basic concepts.
- Know the operation of converters.
- Learn the control of converter and HVDC Transmission.
- Analyze the basic concepts of FACTS.
- To learn the operation of different FACTS devices

UNIT – I

Basic Concepts and Analysis of HVDC Converters: Basic Concepts: Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links –Apparatus required for HVDC Systems – Comparison of AC &DC Transmission,

Analysis of HVDC Converters: Choice of converter configuration, and analysis of Graetz – characteristics of 6 pulse & 12 pulse converters.

UNIT – II

Reactive Power Control in HVDC and System Control: Principal of DC Link Control – Converters Control Characteristics – Firing angle control Current and extinction angle control, sources of reactive power AC Filters – shunt capacitors-synchronous condensers.

UNIT – III

Converter Faults and Harmonics & Introduction to FACTS:

Converter Faults and Harmonics: Converter faults, DC breakers, Characteristics harmonics, Non- Characteristics harmonics, Effect of Pulse number on harmonics.

Introduction to FACTS:

Power flow in an AC System, Dynamic stability considerations, Importance of controllable parameters, Basic types of FACTS controllers, Benefits from FACTS controllers.

UNIT – IV

Voltage source and Current source converters and Shunt Compensators:

VSC AND CSC: Concept of voltage source converter (VSC) – Single phase bridge converter – Three–phase full wave bridge converter, Concept of current source converter (CSC), Comparison of current source converter with voltage source converter.
Shunt Compensators: Objectives of shunt compensation, Mid–point voltage regulation for line segmentation, Thyristor Switched Capacitor (TSC), Thyristor Switched Capacitor – Thyristor Switched Reactor (TSC–TCR).

UNIT – V
Series Compensators and Combined Controllers
Series Compensators: Objectives of series compensation, Concept of series capacitive compensation, GTO thyristors controlled Series Capacitor (GCSC), Thyristor Switched Series Capacitor (TSSC) and Thyristor Controlled Series Capacitor (TCSC), Basic concept of Unified Power Flow Controller (UPFC).

Text Books:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. HVDC Transmission by S.Kamakshaiah andV.Kamaraju-Tata McGraw–Hill
3. "Understanding FACTS" N.G.Hingorani and L.Guygi, IEEE Press.Indian Edition is Available:—Standard Publications, 2001.

Reference Books:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications
4. "Flexible ac transmission system (FACTS)" Edited by Yong Hue Song and Allan T Johns, Institution of Electrical Engineers, London.
5. Thyristor-based FACTS Controllers for Electrical Transmission Systems, by R.MohanMathur and Rajiv k.Varma, Wiley

INSTRUMENTATION
(Professional Elective IV)

B.Tech VIII Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To study the basics of measuring system.
- To study various Electrical transducers and to measure the various types of Non–electrical quantities
- To study various types of digital voltmeters
- To study the working principles of various types of oscilloscopes and their applications.
- To study various types of signal analyzers

Course Outcomes:

- Able to study the basics of measuring system.
- Acquire proper knowledge to use various types of Transducers and able to monitor and measure various parameters such as strain, Fow, temperature and pressure
- Acquire proper knowledge and working principle of various types of digital voltmeters.
- Able to measure various parameters like phase and frequency of a signal with the help of CRO.
- Acquire proper knowledge and able to handle various types of signal analyzers.

SYLLABUS

UNIT-I

Basics of Measuring System: Measuring Systems, Performance Characteristics – Static characteristics – Dynamic Characteristics – Errors in Measurement – Gross Errors – Systematic Errors and Random Errors, Statistical analysis of random errors.

UNIT-II

Transducer Basics and Applications: Definition of transducers – Classification of transducers – Advantages of Electrical transducers –Characteristics and choice of transducers – Principle operation of resistor, inductor, LVDT and capacitor transducers. Measurement of Temperature, Pressure, Strain and Flow.

UNIT-III

Digital Voltmeters: Digital voltmeters – Successive approximation, ramp, dual–Slope integration continuous balance type – Microprocessor based ramp type DVM, digital frequency meter – Digital phase angle meter.

UNIT-IV

Oscilloscope: Cathode ray oscilloscope – Time base generator – Horizontal and vertical amplifiers – Measurement of phase and frequency – Lissajous patterns – Sampling oscilloscope, data logger, Transient recorder.

UNIT-V

Signal Analyzers: Wave Analyzers – Frequency selective analyzers – Heterodyne – Application of Wave analyzers – Harmonic Analyzers – Total Harmonic distortion – Spectrum analyzers – Basic spectrum analyzers – Spectral displays – Vector impedance meter – Q meter – Peak reading and RMS voltmeters

Text Books:

1. Electronic Instrumentation–by H.S.Kalsi Tata MCGraw–Hill Edition, 1995.
2. A course in Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpatrai & Co

Reference Books:

1. Measurement and Instrumentation theory and application, Alan S.Morris and Reza Langari, Elsevier
2. Measurements Systems, Applications and Design – by D O Doeblin
3. Principles of Measurement and Instrumentation – by A.S Morris, Pearson/Prentice Hall ofIndia
4. Modern Electronic Instrumentation and Measurement techniques – by A.D HelfrickandW.D.Cooper, Pearson/Prentice Hall of India.
5. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India.

ADVANCED CONTROL SYSTEMS
(Professional Elective-IV)

B.Tech VIII Semester

L	T	P	C
3	0	0	3

Course Objective:

- Review of the state space representation of a control system: Formulation of different models from the signal flow graph, diagonalization.
- To introduce the concept of controllability and observability. Design by pole placement technique.
- Analysis of a nonlinear system using Describing function approach and Phase plane analysis.
- The Lypanov's method of stability analysis of a system &Formulation of Euler Laugrange equation
- Formulation of linear quadratic optimal regulator (LQR) problem by parameter adjustment and solving riccatti equation.

Course Outcomes:

- State space representation of control system and formulation of different state models are reviewed.
- Able to design of control system using the pole placement technique is given after introducing the concept of controllability and observability.
- Able to analyse of nonlinear system using the describing function technique and phase plane analysis.
- Able to analyse the stability analysis using lypnov method& Minimization of functionals using calculus of variation studied.
- Able to formulate and solve the LQR problem and riccatti equation.

SYLLABUS

UNIT-I

State space analysis: State Space Representation – Solution of state equation – State transition matrix, –Canonical forms – Controllable canonical form – Observable canonical form, Jordan Canonical Form

UNIT-II

Controllability, observability and design of pole placement: Tests for controllability and observability for continuous time systems – Time varying case – Minimum energy control – Time invariant case – Principle of duality Controllability and observability form Jordan canonical form and other canonical forms – Effect of state feedback on controllability and observability – Design of state feedback control through pole placement.

UNIT-IIIDescribing function analysis: Introduction to nonlinear systems, Types of nonlinearities, describing functions, Introduction to phase–plane analysis.

Stability analysis: Stability in the sense of Lyapunov – Lyapunov's stability and Lypanov's instability theorems – Direct method of Lypanov for the linear and nonlinear continuous time autonomous systems.

UNIT-IV

Calculus of variations: Minimization of functional of single function – Constrained minimization – Minimum principle – Control variable inequality constraints – Control and state variable inequality constraints – Euler lagrangine equation.

UNIT-V

Optimal control: Linear quadratic optimal regulator (LQR) problem formulation – Optimal regulator design by parameter adjustment (Lyapunov method) – Optimal regulator design by continuous time algebraic riccatti equation (CARE) – Optimal controller design using LQG framework.

Text Books:

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998
2. Automatic Control Systems by B.C. Kuo, Prentice Hall Publication

Reference Books:

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition, 1996
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw– Hill Companies, 1997.
4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.
5. Optimal control theory: an Introduction by Donald E.Kirk by Dover publications.

POWER QUALITY
(Open Elective IV)

B.Tech VIII Semester

L	T	P	C
2	0	0	2

Course Objective:

- To introduce the power quality problem
- To educate on production of voltages sags, over voltages and harmonics and methods of control.
- To study overvoltage problems
- To study the sources and effect of harmonics in power system
- To impart knowledge on various methods of power quality monitoring.

Course Outcome:

At the end of this course the student should be able to

- Differentiate between different types of power quality problems.
- Explain the sources of voltage sag, voltage swell, interruptions, transients, long duration over voltages and harmonics in a power system.
- Analyze power quality terms and power quality standards.
- Explain the principle of voltage regulation and power factor improvement methods.
- Explain the power quality monitoring concepts and the usage of measuring instruments.

SYLLABUS

Unit-I

Introduction to Power Quality: Terms and definitions of transients, Long Duration Voltage Variations: under Voltage, Under Voltage and Sustained Interruptions; Short Duration Voltage Variations: interruption, Sag, Swell; Voltage Imbalance; Notching D C offset; waveform distortion; voltage fluctuation; power frequency variations.

Unit-II

Voltage Sag: Sources of voltage sag: motor starting, arc furnace, fault clearing etc; estimating voltage sag performance and principle of its protection; solutions at end user level- Isolation Transformer, Voltage Regulator, Static UPS, Rotary UPS, and Active Series Compensator.

Unit-III

Electrical Transients: Sources of Transient Over voltages- Atmospheric and switching transients motor starting transients, pf correction capacitor switching transients, ups switching transients, neutral voltage swing etc; devices for over voltage protection.

Unit-IV

Harmonics: Causes of harmonics; current and voltage harmonics, measurement of harmonics, THD; effects of harmonics on – Transformers, AC Motors, Capacitor Banks, Cables, and

Protection Devices, Energy Metering, Communication Lines etc. harmonic mitigation techniques.

Unit-V

Monitoring and Instrumentation: Power quality monitoring and considerations – Historical perspective of PQ measuring instruments – PQ measurement equipment – Assessment of PQ measuring data – Application
of intelligent systems – PQ monitoring standards.

Text Books:

1. Roger C Dugan, McGrahan, Santoso & Beaty, "Electrical Power System Quality" McGraw Hill
2. Arinthom Ghosh & Gerard Ledwich, "Power Quality Enhancement Using Custom Power Devices" Kluwer Academic Publishers
3. Sankaran, " Power Quality" CRC Press.

Reference Books:

1. Power Quality Primer, Kennedy B W, First Edition, McGraw–Hill, 2000.
2. Understanding Power Quality Problems: Voltage Sags and Interruptions, Bollen M HJ, First Edition, IEEE Press; 2000.
3. Power System Harmonics, Arrillaga J and Watson N R, Second Edition, John Wiley & Sons, 2003.
4. Electric Power Quality control Techniques, W. E. Kazibwe and M. H. Sendaula, Van Nostrad Reinhold, New York.
5. Harmonics and Power Systems –Franciso C.DE LA Rosa–CRC Press (Taylor & Francis)

Power Quality in Power systems and Electrical Machines–EwaldF.fuchs, Mohammad A.S. Masoum–Elsevier.

INFORMATION TECHNOLOGY
COURSE STRUCTURE
I YEAR, SEMESTER- I(1ST SEMESTER)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18IT1T01	HSMC	English-I	2	-	-	2	2
2	18IT1T02	BSC	Linear Algebra &Differential Equations	3	1	-	4	4
3	18IT1T03	BSC	Applied Physics	3	-	-	3	3
4	18IT1T04	ESC	Problem Solving Approaches	3	-	-	3	3
5	18IT1T05	ESC	Engineering Graphics	3	-	-	3	3
6	18IT1L06	HSMC	English Communication Skills Lab-I	-	-	2	2	1
7	18IT1L07	BSC	Applied Physics Lab	-	-	3	3	1.5
8	18IT1L08	ESC	Problem Solving Approaches Lab	-	-	3	3	1.5
9	18IT2L09	ESC	IT Workshop	-	-	2	2	1
Total Number of Credits								**20**

I Year, Semester- II(2nd Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18IT2T01	HSMC	English-II	1	-	**2**	3	2
2	18IT2T02	BSC	Vector Calculus & Fourier Transforms	3	-	-	3	3
3	18IT2T03	BSC	Applied Chemistry	3	-	-	3	3
4	18IT2T04	BSC	Biology for Engineers	2	-	-	2	2
5	18IT2T05	ESC	Basic Electrical & Electronics Engineering	3	-	-	3	3
6	18IT2T06	ESC	Data Structures Through C	3	1	-	4	4
7	18IT2L07	BSC	Applied Chemistry Lab	-	-	3	3	1.5
8	18IT2L08	ESC	Data Structures Through C Lab	-	-	3	3	1.5
9	18IT2T09	MC	Environmental Studies	-	-	2	2	-
Total Number of Credits								**20**

II Year, Semester- I(3rd Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18IT3T01	BSC	Probability & Statistics	3			3	3
2	18IT3T02	PCC	Object Oriented Programming	3			3	3
3	18IT3T03	PCC	Advanced Data Structures	3			3	3
4	18IT3T04	ESC	Digital Logic Design	3			3	3
5	18IT3T05	HSMC	Effective Technical Communication	3			3	3
6	18IT3L07	PCC	Object Oriented Programming Lab			4	2	2
7	18IT3L08	PCC	Advanced Data Structures Lab			4	2	2
8	18IT3L09	ESC	R programming Lab			4	2	2
9	18IT3T06	MC	Indian Constitution	2			2	--
10	18IT3L10	P	Technical Seminar	1			1	1
Total Number of Credits								**22**

II Year, Semester- II(4th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18IT4T01	BSC	Discrete Mathematical structures	2			2	2
2	18IT4T02	PCC	Database Management Systems	3			3	3
3	18IT4T03	PCC	Computer Organization & Architecture	2			2	2
4	18IT4T04	PCC	Operating Systems	3			3	3
5	18IT4T05	HSMC	Managerial Economics and Financial Analysis	3			3	3
6	18IT4T06	HSMC	Professional Ethics	3			3	3
7	18IT4L07	PCC	Operating Systems &linux programmingLab			4	2	2
8	18IT4L08	PCC	Database Management Systmes Lab			4	2	2
9	18IT4L09	ESC	Python Programming Lab			4	2	2
Total Number of Credits								**22**

III Year, Semester- I(5th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1.	18IT5T01	PCC	Data Mining & Warehousing	2	1	-	3	3
2.	18IT5T02	PCC	Web Technologies	2	-	-	2	2
3.	18IT5T03	PCC	Design and Analysis of Algorithms	2	1	-	3	3
4.	18IT5T04	PCC	Formal Languages & Automata Theory	2	-	-	2	2
5.	18IT5T 05/06/07	PEC	**Program Elective-I** 18IT 5T05 Internet of Things 18IT 5T06 Unix & Shell Programming 18IT 5T07 Agile Technologies	3	-	-	3	3
6.	**OEC Open Elective-I**			3			3	3
7.	18IT5L16	PCC	Data Mining Lab			3	1.5	1.5
8.	18IT5L17	PCC	Web Technologies Lab			3	1.5	1.5
							Total Number of Credits	**19**

III Year, Semester- II(6th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1.	18IT6T01	PCC	Compiler Design	2	1	-	3	3
2.	18IT6T02	PCC	Computer Networks	3	-	-	3	3
3.	18IT6T03	PCC	Software Engineering	3	-	-	3	3
4.	18IT6T 04/05/06	PEC	**Program Elective-II**	3	-	-	3	3
			18IT6T 04 Business Intelligence					
			18IT6T 05 UML & Design Patterns					
			18IT6T 06 Advanced Java Programming					
5.	**OEC Open Elective-II**			3	-	-	3	3
6.	18IT6L21	PCC	Computer Networks Lab	-	-	4	2	2
7.	18IT6L22	PCC	Software Engineering Lab	-	-	4	2	2
8.	18IT6T23	MC	Essence of Indian Traditional Knowledge	2	-	-	2	-
						Total Number of Credits		**19**

IV Year, Semester- I(7th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18IT7T01	PCC	Big Data & Hadoop	3			3	3
2	18IT7T02	PCC	E-Commerce	3			3	3
3	18IT7T 03/04/05	PEC	**Program Elective-III** 18IT7T 03 Information Retrieval Systems 18IT7T 04 Software Testing Methodologies 18IT7T 05 Software Project Management	2	1		3	3
4	18IT7T 06/07/08	PEC	**Program Elective-IV** 18IT7 T06 Cryptography and Network Security 18IT7 T07 Mobile Computing 18IT7 T08 Multimedia and Application Development	2	1		3	3
5	**OEC Open Elective-III**			3			3	3
6	18IT7L20	PCC	Big Data & Hadoop Lab			4	2	2
7	18IT7T21	PROJ	Mini Project/Internship			4	2	2
							Total Number of Credits	**19**

IV Year, Semester- II(8th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18IT8T 01/02/03	PEC	**Program Elective-V** 18IT8 T01 Cloud Computing 18IT8 T02 Machine Learning & Deep Learning 18IT8 T03 Principles of TCP/IP	3	-	-	3	3
2	18IT8T 04/05/06	PEC	**Program Elective-VI** 18IT8 T04 Real Time Systems 18IT8 T05 Human Computer Interaction 18IT8 T06 Introduction to Main-Frame Systems	3	-	-	3	3
3	**OEC Open Elective-IV**			3	-	-	3	3
4	**OEC Open Elective-V OR MOOC**			2	-	-	2	2
5	18IT8L 22	PROJ	Major Project	-	-	16	8	8
Total Number of Credits								**19**

Open Elective – 1

S.No	Course Code	Course Title	Offering Dept
1	18IT5T08	Employability Skills: Competitive Coding	CSE/IT
2	18IT5T09	Optimization Techniques	BED
3	18IT5T10	Electrical Engineering Materials	EEE
4	18IT5T11	Basics of Control Systems	EEE
5	18IT5T12	Design Thinking &Product Innovation	ME
6	18IT5T13	Solid State Devices and Circuits	ECE
7	18IT5T14	Principles of Communication	ECE
8	18IT5T15	Employability Skills: Quantitative Aptitude & Reasoning	BED

Open Elective II

S.No	Course Code	Course Title	Offering Dept
1	18IT6T07	Employability Skills: Quantitative Aptitude & Reasoning	BED
2	18IT6T08	Basic Civil Engineering	CE
3	18IT6T09	Sustainable Engineering Practices	CE
4	18IT6T10	Disaster Management	CE
5	18IT6T11	Low Cost Housing	CE
6	18IT6T12	Design and Estimation of Electrical Systems	EEE
7	18IT6T13	Energy Audit, Conservation and Management	EEE
8	18IT6T14	Nanotechnology	ME
9	18IT6T15	Microprocessors and microcontroller	ECE
10	18IT6T16	Embedded Systems	ECE
11	18IT6T17	Employability Skills: Competitive Coding	CSE/IT
12	18IT6T18	Computer Networks	CSE/IT
13	18IT6T19	Managerial Economics and Financial Analysis	DMS
14	18IT6T20	Cross Cultural management	DMS

Open Elective III

S.No	Course Code	Course Title	Offering Dept
1	18IT7T09	Fuzzy Sets and Fuzzy Logic	BED
2	18IT7T10	Remote sensing and GIS	CE
3	18IT7T11	Green Buildings	CE
4	18IT7T12	Electric Vehicles	EEE
5	18IT7T13	Special Electrical Machines	EEE
6	18IT7T14	Bio Medical Instrumentation	ECE
7	18IT7T15	Nano Electronics	ECE
8	18IT7T16	Software Project Management.	CSE/IT
9	18IT7T17	Computer Architecture & Organization	CSE/IT
10	18IT7T18	Technology Innovation Management	DMS
11	18IT7T19	Global Environment Trends	DMS

Open Elective IV

S.No	Course Code	Course Title	Offering Dept
1	18IT8T07	Soft Computing Techniques	ECE
2	18IT8T08	Satellite communication	ECE
3	18IT8T09	Internet of Things	CSE
4	18IT8T10	Utilization of Electrical Energy	EEE
5	18IT8T11	Mechatronics	ME
6	18IT8T12	Green Engineering Systems	ME
7	18IT8T13	Micro - Electro - Mechanical Systems	ME
8	18IT8T14	Advanced Drawing for Civil Engineers	CE
9	18IT8T15	Polymer Chemistry	BED

Open Elective V

S.No	Course Code	Course Title	Offering Dept
1	18IT8T16	Operating Systems	CSE
2	18IT8T17	Robotics	ME
3	18IT8T18	Solar Energy Systems	ME
4	18IT8T19	Power Quality	EEE
5	18IT8T20	Additive Manufacturing	ME
6	18IT8T21	Advanced Civil Engineering Technologies	CE

Note: Prior approval from the department is required for the selection of Open Electives

I YEAR SEMESTER-I SYLLABUS

ENGLISH-1

I Year – I Semester

Lecture: 2 Practical: 0 Internal Marks: 30

Credits: 2 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

CO 1: Use English language, both written and spoken, competently and correctly.

CO 2: Improve comprehension and fluency of speech.

CO 3: Gain confidence in using English in verbal situations.

CO 4: Hone the communication skills to meet the challenges of their careers very successfully.

CO 5: Strengthen communication skills in different contexts like formal and informal.

CO 6: Develop knowledge of different fields and serve the society accordingly

Syllabus:

Unit 1	Human Resources : Ideal Family
Unit 2	In London:Verger
Unit 3	Our Living Environment : Three Days to See
Unit 4	Energy: Alternative Sources: War:
Unit 5	Principles of Good Writing : Letter Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: -

Course Outcomes:

1. Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations
2. Illustrate the methods of computing eigen values and eigen vectors
3. Able to analyze the real life situations, formulate the differential equations then apply the solving methods
4. Explain the techniques of solving the linear differential equations
5. Optimize functions of several variables and able to find extreme values of constrained functions

Syllabus:

UNIT I: Linear systems of equations, Eigen values & Eigen vectors

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations.Gauss -Jordan method, LU decomposition method,

Application: Finding the current inelectrical circuits, Eigen values, Eigen vectors, Properties of Eigen values(without proofs).

UNIT II: Quadratic forms & Differential calculus:

Cayley-Hamilton theorem(without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor's and Maclaurin's series.Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor's theorem for functions of two variables.

Applications: Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT III: Differential equations of first order:

Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli's equation, Exact differential equations.Equations reducible to exact equations.

Applications: Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth.

UNIT IV: Differential equations higher order:

Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x).Rules to find the particular integral(RHS term of the type e^{ax} V(x), any other function), Method of variation of parameters.

Application: L-C-R circuits.

UNIT V: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t. Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rd Edition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. . P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

2.ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED PHYSICS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes

1: Study of lasers and optical fibers with an emphasis of their application in communication in particular.

2: Outline the principles of Quantum mechanics to understand the principles of solid state materials for use in engineering applications.

3: The Analytical study of response of materials to Electromagnetic fields.

4: To study various magnetic and dielectric materials and their Engineering applications.

5: To Gain knowledge on the physics of semiconductors for their engineering applications.

SYLLABUS

UNIT –I

LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Recording and Reconstruction of Holography-Applications.

OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Advantages of Optical Fibers in Communication – Applications in Communication.

UNIT – II

QUANTUM THEORY OF SOLIDS

Matter waves – Physical significance of wave function – Schrodinger's Time independent wave equation.Schrodinger's Time dependent wave equation - Particle in a 1 Dimensional Potential well.

UNIT-III

ELECTROMAGNETIC FIELDS

Grad – Div – Curl – Gauss and Stoke's theorems – Fundamental Laws of Electromagnetism.

Maxwell's Equations – Poynting vector – Propagation of Electromagnetic waves in a dielectric medium.

UNIT-IV

MAGNETIC MATERIALS

Origin of magnetic moment – Classification of magnetic materials (Dia, Para, Ferro) - Weiss theory of Ferromagnetic domains – Hysteresis – Soft and Hard magnetic materials - Applications.

DIELECTRIC MATERIALS

Types of Polarization – Dielectrics in DC and AC fields – Internal field –ClausiusMossoti Equation – Dielectric Loss and Dielectric Breakdown – Ferroelectric Hysteresis and applications.

UNIT-V

PHYSICS OF SEMICONDUCTORS

Carrier Concentration in Intrinsic semiconductor – Fermi level and electrical conductivity in intrinsic semiconductors - Carrier Concentration in Extrinsic semiconductors – Variation of Fermi level with temperature and impurity concentration.Drift and Diffusion currents – Einstein's relation – Hall Effect & its applications.

Text Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications
2. Engineering Physics by M.Avadhanuluand P.G. Kshirasagar – S Chand Publications (10^{th} Edition)
3. Applied Physics by S.O.Pillai – New Age Publications – (3^{rd} Edition)

Reference Books:

1. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014 Edition)
2. Engineering Physics by M.Armugam – Anuradha Publications
3. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications

Problem Solving Approaches

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes

The student will learn

1. To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
2. To implement conditional branching, iteration and recursion.
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To use structures and files

SYLLABUS

UNIT – I:

Introduction to Computer Problem Solving: Programs and Algorithms, characteristics of an algorithm, Flowchart,Pseudo-code, TheProblem – Solving Aspect, Top-Down design

Fundamental Algorithms Introduction,Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, reversing the digits of an Integer.

UNIT – II:

Factoring Methods: Introduction,GCD of two Integers, Generating Prime numbers, Computing the Prime Factors of an Integer, Generation of pseudo-random numbers

Array Techniques: Introduction, Array Order Reversal, Finding the Maximum number in a set, Removal of duplicates from an ordered array, Partitioning an Array

UNIT-III:

Programming Languages and Introduction to C Programming: Properties of Machine Language, Assembly Language, High-Level Languages, Procedural and Object-Oriented Languages.Structure of C program, Indentation, Comments,Identifiers& variables, DataTypes

Interactive Input, Formatted Output, FormatModifiers, Operators, Operator precedence &

Associativity, Relational expressions, Type Casting,Mathematical Library Functions, Selection control statements: if and switch

UNIT -IV:

Repetition structures: Basic Loop Structures: while, for , do-while, Nested loops, **Modular Programming:** Functions and parameter declarations, Returning a Value,Functions with Empty Parameter Lists,Variable Scope

Modular Programming Variable Storage Class: Local, Global,**Pointers:** declaration and its usage, Functions with parameters: pass by value, pass by address, pointer to a function and function pointer

UNIT-V:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays-Matrices

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions related to strings.

TEXT BOOKS:

[1] R.G. Dromey, "How to Solve it By Computer", Prentice-Hall International Series in Computer Science,1982.

[2] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

REFERENCE BOOKS:

[1] DENNIS M. RITCHIE, BRIAN W KERNIGHAN, " The C Programming Language", Prentice-Hall International Series in Computer Science, Second Edition.

[2] Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction toProgrammingandProblemSolvingWithPascal",JohnWileyandSonsInc ,1984.

[3] David Gries, "The Science of Programming", Springer Verlag,1981.

ENGINEERING GRAPHICS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes:

1: Draw the polygons, ellipse, parabola, hyperbola, cycloids and involutes for various types of profiles.

2: Construction of various scales like plain, diagonal and venier scales .Draw the orthographic projections of the points, lines.

3: Draw the projections of planes.

4: Draw the projections of solids

5: Convert Orthographic projections to isometric projection and vice versa.

SYLLABUS:

UNIT I:

Lettering,Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods. Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes-Tangent and Normals to the above curves.

UNIT II :

Orthographic projections: Introduction, Projections of points.

Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane, Projections of planes inclined to both the reference planes.

UNIT IV: Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

UNIT V:Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views. Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text Books:

1. Engineering Drawing, N. D. Butt, Chariot Publications
2. Engineering Drawing +Auto CAD, K Venugopal&V Prabhuraja, Newage Publishers.

Reference Books:

1. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree, K. C. John, PHI Publishers
3. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers
4. Engineering Graphics, P.I. Varghese, McGraw Hill Publishers

ENGLISH COMMUNICATION SKILLS LAB-1

I Year – I Semester

Lecture: 0	Practical: 2	Internal Marks: 40
Credits: 1	Tutorial: 0	External Marks: 60

Prerequisites: -

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1 Greetings and Introduction

2 Request Permission & Giving Directions

3 Inviting/Complaining/Congratulating

4 Root Words

5 Phonetics-Sounds and Symbols

6 Pronunciation Rules

References:

1. ***Strengthen Your Steps,*** Maruti Publications

2. ***Interact,*** Orient Blackswan

3. Word Power Made Easy, Pocket Books

APPLIED PHYSICS LAB

I Year – I Semester

Lecture: 0	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

(Any 10 of the following listed experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings - Sonometer
9. Determination of Young's modulus by method of single cantilever oscillations.
10. Melde's experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p - n junction.

Problem Solving Approaches Lab

I Year – I Semester

Lecture: 2	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

List of Experiments:

1. a. Write an algorithm, flowchart and pseudo code to perform all arithmeticoperations
   b. Write an algorithm, flowchart and pseudo code to find average of threenumbers
   c. Write an algorithm, flowchart and pseudo code to find smallest of threenumbers
2. a. Write an algorithm, flowchart and pseudo code for finding smallest divisor ofan integer.
   b. Write an algorithm, flowchart and pseudo code to find x^y
3. Write a C program to convert temperature from Fahrenheit to Celsius and viceversa.
4. Write a C program to find the roots of quadraticequation
5. Write a C program to find whether a given number isprime
6. Write a C program find whether a given number isarmstrong
7. Write a C program to display reverse of a givennumber
8. Write a C program to generate first n- terms of a fibonaccisequence.
9. Write a C program to calculate sin(x) value, where x is input given byuser
10. Write a C program to calculate cos(x) value, where x is input given byuser
11. Write a C program to perform operations on one dimensionalarray
    a. Smallest element of anarray
    b. Largest element of an array
    c. swap smallest and largest element in anarray
12. Write a C program to implement thefollowing
    a. Addition of twomatrices
    b. Multiplication of twomatrices
13. Write a C program to perform the following operations on strings without using string handlingfunctions
    a. To display length of thestring
    b. To check whether a string ispalindrome
    c. To delete n characters from a given position in a givenstring
14. Write recursive and non recursive programs for thefollowing
    a. Factorial of anumber
    b. GCD of twonumbers
    c. Fibonacciseries
15. Write a program which illustrates Storageclasses

IT WORKSHOP

I Year – I Semester

Lecture: 2	Practical: 2	Internal Marks: 40
Credits: 1	Tutorial: 0	External Marks: 60

Prerequisites: -

LIST OF EXPERIMENTS:

1. **System Assembling, Disassembling and identification of Parts / Peripherals**

2. **Operating System Installation**-Install Operating Systems like Windows, Linux .

3**. MS-Office**

a. **Word** - Formatting, Page Borders, Reviewing, Equations, symbols.

b. **Spread Sheet** - organize data, usage of formula, graphs, charts.

c. **Power point** - features of power point, guidelines for preparing an effective presentation.

d. **Access**- creation of database, validate data.

4. **Network Configuration & Software Installation**-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.

5. **Internet and World Wide Web**-Search Engines, Types of search engines, netiquette, cyber hygiene.

6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

7. **MATLAB-** basic commands, subroutines, graph plotting.

8. **LATEX**-basic formatting, handling equations and images.

Text Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition by Gary B. Shelly, Misty E. Vermaat and Thomas J.
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudraprathap, Oxford University Press, 2002.
5. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
6. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
8. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

I YEAR

SEMESTER-II

SYLLABUS

ENGLISH II

I Year – II Semester

Lecture: 1	Practical: 2	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

Unit 1 Transport: Problems and Solutions

The Scarecrow

Unit 2 The Drunkard

A Village Lost to the Nation

Unit 3 Evaluating Technology

The Knowledge Society

Unit 4 Industry: Safety and Training

Martin Luther King and Africa

Unit 5 Man's Peril (Detailed)

Report Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

ENGLISH COMMUNICATION SKILLS LAB II

1	a.	Introducing Yourself and Other People
		Employability Skills
	b.	Introduction to Soft Skills
		My Skills, My Strengths
2	a.	Discussing Daily Routines
		Free Time Activities
	b.	Describing Family
		Talking about Family
3	a.	Giving Directions
		Ordering Food
	b.	Asking for and Paying the Bill
		Describing Appearances and Personality
4	a.	Writing a Product Description-1
	b.	Writing a Product Description-2
5	a.	Describing an Advertised Job
		Skills Needed for Different Jobs
	b.	What Kind of Job Are You Interested in?
		Finding out about a Job
6.	a.	Managing Nerves in a Presentation
	b.	Learning about Presentations

Reference:

Online Resources:

https://goo.gl/v57WHe

http://www.careerbuilder.co.in

https://goo.gl/w3FweC

https://goo.gl/4GoueJ etc.

VECTOR CALCULUS & FOURIER TRANSFORMS

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

UNIT I: Special functions &Multiple integrals:

Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Multiple Integrals: Double integrals in Cartesian &polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

UNIT II: Vector Calculus:

Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div& Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Vector Integration: Line integral, Green's theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

UNIT III: Fourier Series:

Euler's formulae(without proof), Conditions of a Fourier expansion, Functions having points of discontinuity.Change of interval, Even and odd functions, Half-range series.

UNIT IV: Fourier Transforms:

Fourier Integral, Fourier cosine & sine integral, complex forms of Fourier integral.

Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms(without proof), Convolution theorem(without proof), finite Fourier sine & cosine transforms.

UNIT V: Applications of Partial Differential Equations:

Definition of PDE, Classification of 2^{nd} order PDE, Variable separable method, Vibrations of a stretched string – Wave equation.One-dimensional heat flow, Two-dimensional heat flow, Solution of Laplace's equation.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43^{rd}Edition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1^{st} Edition, 2007.

Reference Books:

1. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9^{th} Edition, 2014.
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10^{th} Edition, 2015.

APPLIED CHEMISTRY

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

1:Study of polymers and composite materials enable us to use them in a good number of engineering fields

2: Industries are run by the quality of fuels and energy crisis can be met by broad understanding of different fuels

3: Electrochemical principles form the basis of batteries that are being developed. Destruction of metals and alloys can be prevented by understanding the science of corrosion.

4:Study of the existing developed materials forms a basis for developing more number of advanced materials

5: Methods of purification of water can be known so that more of them can be developed

6:The importance of engineering materials in the domestic and engineering fields can be understood.

SYLLABUS:

UNIT I: POLYMERS AND PLASTICS

Introduction- Degree of polymerization-functionality-tacticity-Types- Addition polymerization-Definition-PVC-Properties-applications condensation polymerization-Bakelite-Properties-applications,Physical and mechanical properties – Conducting polymers– Biodegradable polymers-applications– Natural rubber- Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol -Thermoplastics and Thermosetting plastics –- Composite materials & Fiber reinforced plastics

UNIT II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes) Primary cells: Zinc – air cellSecondary cells:- Lithium ion batteries, Pb-acid cell,

Fuel cells:- H_2-O_2 fuel cell and molten carbonate fuel cells

Corrosion:Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating -Electroless plating

UNIT III: NON CONVENTIONAL ENERGY SOURCES

Solar Energy:- Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance

Non-conventional energy sources:

(i) Hydropower include setup a hydropower plant (schematic diagram)

(ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant

(iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level.

(iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation.

(v) Biomass and biofuels

UNIT IV: SEMICONDUCTORS AND SUPER CONDUCTORS

Non –Elemental Semi conductors: Stoichiometric, Non- Stoichiometric ,Controlled valency&Chalcogen photo/semiconductors- Preparation of Semiconductors Ge & Si by crystal pulling technique – purification by Zone refining.

Semiconductor Devices:- Diode –Transistor.

Super conductors*:-*Definition-Types- Characteristics –applications

UNIT V: ADVANCED MATERIALS AND GREEN CHEMISTRY

Nano materials*:-*Introduction –General methods of preparation (top down and bottom up)

Liquid Crystals-Definition, classification,applications

Green synthesis:-Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources(microwave method) -R4M4 principles-Econoburette.

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

UV Spectroscopy- Basic principle-Instrumentation- Applications

IR Spectroscopy- Basic principle-Instrumentation- Applications

NMR Spectroscopy- Basic principle-Instrumentation- Applications

Analytical techniques: FE-SEM,TEM,BET

Chromatography techniques: Paper chromatography, Thin layer chromatography- applications

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM

Biology for Engineers

I Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

After studying the course, the student will be able to:

1: Understand how biological observations lead to major discoveries and the morphological,Biochemical and ecological classification of organisms.

2:Understand that all forms of life have the same building blocks and their involvement in the Maintenance and metabolic processes of living organisms.

3:Classify enzymes and distinguish between different mechanisms of enzyme action andStudy the chemical reactions that are catalyzed by enzymes. Apply thermodynamic, Principles to biological systems and able to understand major chemical processes that occur, Within a living organism in order to maintain life.

4: Identify DNA as a genetic material in the molecular basis of information transfer.

5: Identify and classify microorganisms, understand media compositions and growth of Microorganisms

SYLLABUS:

Unit-1: Introduction

Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry.

Classification of organisms based on (a) Cellularity- Unicellular or Multicellular , (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

Unit-2: Biomolecules

Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function.

Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

Unit-3: Enzymes & Metabolism

Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters.\ Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

Unit-4: Information Transfer

Concept of genetic code, Molecular basis of information transfer; Transcription and translation.

Unit-5: Microbiology

Concept of species and strains, Identification of Micro organisms.

Sterilization and media compositions, Growth kinetics.

Text/Reference Books:

1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd

2) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons

3) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

5) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

Basic Electrical & Electronics Engineering

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

Unit – I: Electric Circuits

Basic definitions, Types of network elements & sources, Ohms law, Kirchhoff's laws, Series & parallel circuits.Source transformation, Network reduction reductions, Introduction to AC circuits.

Unit – II: Electrical Machines

Basic laws – Faraday's laws of electromagnetic induction, Lenz's law, Right hand thumb rule, Fleming's left hand and right hand rules,Construction, working principle and applications of DC machinesConstruction, working principle and applications of transformers, induction motor and synchronous machines.

Unit – III: Electrical Power Generation, Transmission and Distribution

Sources of Energy – conventional & non conventional, Introduction and layout of thermal, hydel power plants, Introduction and layout of nuclear power plants, solar power plants, Concepts of power transmission and distribution using single line diagram.

Unit – IV: Electrical Installations & Safety

Components of Switchgear – fuse, MCBs, types of wires & cables, earthing, different types of batteries, Elementary calculations for energy consumption and types of tariffs. Energy Conservation.Electric shock and first aid, Hazardous areas, General principles of electric safety.

Unit – V: Basic Electronic Devices and their applications

Introduction to semi-conductor physics, PN junction diode, Zener diode, Transistor - operation, characteristics and configurations, Operation of transistor as a switch. Half wave, full wave and

bridge rectifier using diodes, types of filters, Zener diode as a voltage regulator, transistor as an amplifier. introduction to feed back amplifiers.

Text Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.

2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

3. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGrawHill, Second Edition

Data Structures through C

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: Problem Solving Approaches

SYLLABUS:

UNIT - I:

Sortings: Bubble sort, Insertion sort, section sort

Searching: linear search, binary search

UNIT II:

Pointers: Introduction, Pointer Arithmetic and Arrays, Memory Allocations Functions ,Compatibility, Lvalue and Rvalue, Arrays and Pointers, Passing an Array to a Function, , Array of Pointers. Pointers For Inter Function Communications, Pointers to Pointers

UNIT III:

Structures: Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

Unions: Referencing Unions, Initializers, Unions and Structures, Applications.

Text Input/output: Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

UNIT IV:

Stacks: Definition, Representing stacks, ADT Stack and its operations: Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms. Recursion, Towers of Hanoi problem.

Queues: Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

UNIT V:

Linked lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; **Doubly linked list:** operations and algorithms.

Circular Linked Lists: all operations their algorithms, Linked representation of Stack and Queue. Polynomials: Addition, Multiplication.

TEXT BOOKS:

[1] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

[2] Mark Allen Weiss,"Data structure and Algorithm Analysis in C". Addison Wesley Publication.2006.

[3] SEYMOUR LIPSCHUTZ, "Data Structures With C – by Schaum Series".

REFERENCE BOOKS:

[1] Horowitz Sahni and Anderson-Freed "Fundamentals of Data Structures in C". 2nd Edition, Universities Press,2008.

[2] Richard F. Gilberg& B. A. Forouzan "Data Structures A Pseudocode Approcah with C", Second Edition, CENGAGELearning.

Applied chemistry laboratory

I Year – II Semester

Lecture: 0 Practical: 3 Internal Marks: 40

Credits: 1.5 Tutorial: 0 External Marks: 60

Prerequisites: -

List of Experiments:

S.No	Name of the Experiment
1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na2CO3 and NaOH.
4	Determination of temporary and permanent hardness of water using standard EDTA solution.
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

Data Structures through C Lab

I Year – II Semester

Lecture: 0 Practical: 3 Internal Marks: 40

Credits: 1.5 Tutorial: 0 External Marks: 60

Prerequisites: C Programming

List of Experiments

1. Write C programs to sort the list of elements using followingtechniques
   a. Bubble Sortb. InsertionSortc. SelectionSort
2. Write C programs to search for an element in an array using following techniques
   a. LinearSearchb. BinarySearch
3. Write a C program to demonstrate call by value and call byreference
4. Write a C program to display student information usingstructures
5. Write a C program to count number of lines, words and characters in a file
6. Write a C program to perform stack operations usingarrays
7. Write a C program to perform queue operations usingarrays
8. Write C program to implement stackapplications.
   a. Conversion of Infix expression to postfixexpression
   b. Evaluation of postfixexpression c. Towers ofHanoi
9. Write a C program to perform circular queue operations usingarrays
10. Write a C program to implement following operations on Single Linked List
    a. Insertion b. Deletionc. Search
11. Write a C program to implement following operations on DoubleLinked List
    a. Insertion b. Deletionc.Search
12. Write a C program to implement stack operations using linkedlist
13. Write a C program to implement queue operations using linkedlist
14. Write a C program to add two polynomials using linkedlist
15. Write a C program to multiply two polynomials using linkedlist

ENVIRONMENTAL STUDIES

I Year – II Semester

Lecture: 2 Practical: 0 Internal Marks: 30

Credits: 0 Tutorial: 0 External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

1. The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
2. The concepts of the ecosystem and its function in the environment.
3. The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
4. The various attributes of the pollution and their impacts and measures to reduce or controlthe pollution along with waste management practices.
5. The environmental legislations of India and Social issues and the possible means
6. Environmental assessment and the stages involved in EIA.

SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope ofEnvironmental Studies- Importance of Environmental Studies- Need for public awareness,Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference,Earth summit

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem ,Desert ecosystem- Aquatic ecosystem: pond ,lake ecosystem- Streams ,river ecosystem, Oceans

UNIT-II :NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources-Forest resources**:** Use and over-exploitation

- Deforestation-Timber extraction-Mining- Conservation-Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems-Water conservation, rain water harvesting, water shed management-Energy resources**:** renewable energy sources –solar-wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity-Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India-Conservation of biodiversity-Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV:ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution-Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects,control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTALLEGISLATION&MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks-Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks-Environmental Impact Assessment and its significance- Preparation of EnvirronmentalManagement Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4.Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

II YEAR SEMESTER-I SYLLABUS

PROBABILITY AND STATISTICS

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function-Expectation-Moment Generating function-Moments and properties.Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-MomentGenerating function-Moments and properties.Continuous distribution: Normal distributions, Normalapproximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Centrallimit theorem- t-distribution- Sampling distribution of means (s unknown)- Samplingdistribution of variances -χ^2 and F-distributions- Point estimation- Maximum error ofestimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Levelof significance - One tail and two-tail tests- Tests concerning one mean and proportion, twomeans-Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve bymethod of least squares-Goodness of fit. Correlation and Regression – Properties.

Text Books:

1. **Richards A Johnson, Irvin Miller and Johnson E Freund**. Probability and Statistics for Engineering, 9th Edition, PHI.

2. **Jay l.devore,** Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

1. **ShronL.Myers, Keying Ye, Ronald E Walpole,** Probability and StatisticsEngineers and the Scientists,8th Edition, Pearson 2007.

2. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction toprobability and statistics, Cengage learning, 2009.

OBJECT ORIENTED PROGRAMMING

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Understand the principles of object oriented concepts. Define classes and objects by identifying real world entities, their properties and functionalities.
2. Reuse the existing classes by using inheritance and understand the concepts of packages and exception handling.
3. Make use of built-in classes in Java and understand the concept of thread.
4. Develop user interfaces using applets, AWT and Event handling in java.
5. Create portable GUI applications using Swing components.

SYLLABUS:

UNIT-I:

Introduction to OOP, procedural programming language vs object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector.

UNIT-II:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang

package, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

Exception handling, importance of try, catch, throw, throws and finally block, userdefined exceptions, Assertions.

UNIT-III:

Multithreading: Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-IV: Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

UNIT-V:

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List, Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

TEXT BOOKS:

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.
3. JAVA for Beginners,4e,JoyceFarrell,Ankit R. Bhavsar,Cengage Learning.
4. Object oriented programming with JAVA,Essentials and Applications, Raj Kumar Bhuyya,Selvi,Chu,TMH.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1.JavaProgramming,K.Rajkumar.Pearson
2.CoreJava,BlackBook,RNageswararao,Wiley,Dream Tech
3.Core Java for Beginners,RashmiKantaDas,vikas.
4.Object Oriented Programming Through java, P.Radha Krishna, Universities Press

ADVANCED DATA STRUCTURES

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: Data Structures

COURSE OUTCOMES:

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

1. Create hash based index for efficient search
2. Analyze the efficiency of various tree data structures
3. Understand the concept of priority queues and its applications
4. Implement tree data structures for multi-way search
5. Identify and implement shortest path in various real time problems.

SYLLABUS:

UNIT-I:

SORTING: Quick Sort, Merge Sort, External Sorting, Introduction, K-way Merging - Buffer Handling for parallel Operation.

HASHING : Introduction-Static Hashing- Hash Table- Hash Functions- Secure Hash Function- Overflow Handling- Theoretical Evaluation of Overflow Techniques

UNIT-II: TREES

Introduction, Terminology, Representation of Trees, Binary Trees, Properties of Binary Tress, Binary Tree Representations, Tree Traversal: Inorder Traversal, Preorder Traversal, Postorder Traversal, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree, AVL Trees, Insertions and Deletions.

UNIT-III: PRIORITY QUEUES (HEAPS)

Model, Simple Implementation, Binary Heap-Structure Property-Heap-Order Property-Basic Heap Operations- Other Heap Operation, Applications of Priority Queues- The Selection Problem Event Simulation Problem, Binomial Queues- Binomial Queue Structure – Binomial Queue Operation-Implementation of Binomial Queues

UNIT-IV: MULTIWAY SEARCH TREES

M-Way Search Trees, Definition and Properties- Searching an M-Way Search Tree, B-Trees, Definition and Properties- Number of Elements in a B-tree- Insertion into B-Tree- Deletion from a B-Tree- B+-Tree Definition- Searching a B+-Tree- Insertion into B+-tree- Deletion from a B+-Tree.

UNIT-V: GRAPHS

Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search, Connected Components, SpanningTrees, Minimum Cost Spanning Trees, Kruskal'S Algorithm, Prim'sAlgorithm,Sollin's Algorithm, Dijkstra's Algorithm

TEXT BOOKS:

1. Data Structures, a Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan,Cengage.
2. Fundamentals of DATA STRUCTURES in C: 2nded, , Horowitz , Sahani, Andersonfreed,UniversitiesPress
3. Data structures and Algorithm Analysis in C, 2nedition, Mark Allen Weiss, Pearson

REFERENCE BOOKS:

1. Web : http://lcm.csa.iisc.ernet.in/dsa/dsa.html
2. http://utubersity.com/?page_id=878
3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures
4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
5. File Structures :An Object oriented approach with C++, 3ed, Michel J Folk, Greg Riccardi, BillZoellick

DIGITAL LOGIC DESIGN

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Apply Boolean laws & theorems to digital Logic functions; simplify the Boolean functions to the minimum number of literals
2. Design different types of combinational logic circuits using Adders, Subtractors, Decoders, Multiplexers and Magnitude Comparators.
3. Design clocked sequential logic circuits using flip flops
4. Design different types of Counters, Registers.
5. Contrast Programmable logic devices(PROM, PAL, and PLA) and its design.

SYLLABUS:

UNIT I:

Number Systems and Codes: Decimal, Binary, Octal, Hexadecimal Number systems and their conversions, Complements: r's complement, (r-1)'s complement, Arithmetic additions, subtraction using the method of complements. Codes: BCD, Excess 3, Gray codes.

Boolean algebra And Logic Gates:

Digital computers and digital systems, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Digital Logic Gates, Universal gates, Canonical and standard forms, simplification of Boolean

Functions using K maps (up to five variables), Don't-Care conditions, Tabulation method, Two level NAND and NOR implementations.

UNIT II:

Combinational Logic:

Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure. Exclusive-or Gates, Parity Generators and Checkers.

Combinational Logic with MSI and LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Demultiplexers, Encoders, Multiplexers, Code Conversion.

UNIT III :

Sequential Logic: Sequential circuits, Classification, Latches, Flip Flops, Triggering of Flip-Flops, Master slave flip-flop, Flip-Flop Excitation tables, flip-flop direct inputs.

Analysis of Clocked Sequential Circuits: State table, State diagram, state equations, State Reduction and Assignment, Design Procedure, design with unused states, Design of Counters.

UNIT IV:

Registers: Register, Left Shift register, Right shift register, Bidirectional Shift register, Universal Shift register.

Counters: Design of Synchronous counters, Ripple counters, Up/Down counters, Ring counter, Johnson counter.

UNIT V:

Programmable Logic & Clock Circuits: Read – Only Memory (ROM), PROM, Programmable Logic Device (PLD), Programmable Logic Array (PLA), Programmable Array Logic (PAL), 555 timer, Astable and Monostable operations.

TEXT BOOKS

1.M.Morris Mano, Digital Logic & Computer Design 1 e/d reprint, Pearson education, 2013.
2. Roth ,Fundamentals of Logic Design, Cengage,5/e.

REFERENCE BOOKS:

1. Donald e Givone, Digital Principles and Design, TMH.
2. A.AnandKumar ,Fundamentals of Digital Circuits,4th Edition,PHI
3. ZviKohavi, Switching and Finite Automata Theory, 2nd Edition, TMH, 1978.

Humanities-I: Effective Technical Communication

II Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

SYLLABUS:

UNIT-I: Vocabulary Building

The concept of word formation
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
Synonyms, antonyms and standard abbreviations

UNIT-II: Writing Skills

Sentence structures
Use of phrases and clauses in sentences
Importance of proper punctuation
Creating coherence
Organizing principles of paragraphs in documents
Comprehension
Essay writing

UNIT-III: Identifying Common Errors in Writing

Subject-verb agreement
Noun-Pronoun agreement
Misplaced Modifiers
Articles
Prepositions
Redundancies
Clichés

UNIT-IV: Oral Communication

Common Everyday situations: Conversations and Dialogues
Communication at workplace
Interviews
Formal Presentations

UNITV: Life Skills

Self-assessment and self esteem
Attitudes, values and beliefs
Personal goal setting
Career planning
Managing Time
Complex Problem solving
Creativity

Suggested Readings:

1. Practical English usage, Michael Swan, OUP 1995
2. Remedial English Grammar, F.T.Wood.Macmillan, 2007
3. On writing well. William Zinsser, Harper Resource book, 2001
4. Study Writing, Liz-Hamp-Lyons and Ben Heasly, Cambridge University Press, 2006
5. Communication Skills, Sanjay Kumar and Pushp Latha, Oxford University press, 2011
6. Exercises in spoken English parts I-III, CIEFL, Hyderabad Oxford university press

OBJECT ORIENTED PROGRAMMING LAB

II Year – I Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling.

LIST OF LAB EXPERIMENTS:

Exercise - 1 (Basics)

a). Write a JAVA program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a). Write a JAVA program to implement Single Inheritance.

b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for "super" keyword.

b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism

b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)

a). Write a JAVA program Illustrating exception handling keywords.

b). Write a JAVA program for creation of Java Built-in Exceptions

c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class.

b). Write a program illustrating **isAlive**and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package.

c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse.

b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

ADVANCED DATA STRUCTURES LAB

II Year – I Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: Data Structures, C/C++ programming

COURSE OUTCOMES:

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

1. Develop indices.
2. Implement various search trees.
3. Crate a graph and traverse the graph
4. Develop code for shortest path problems.

LIST OF LAB EXPERIMENTS:

1 To implementation of Quick Sort
2 To implementation of Merge Sort
3 To implementation of Static Hashing (Use Linear probing for collision resolution)
4 To implementation of Binary Search trees.
5 To perform various operations i.e., insertions and deletions on AVL trees.
6 To implement operations on binary heap.
7 To implement operations on graphs
  i) vertex insertion
  ii) Vertex deletion
  iii) finding vertex
  iv)Edge addition and deletion
8 To implementation of Breadth First Search Techniques.
9 To implementation of Depth First Search Techniques.
10 To implement Prim's algorithm to generate a min-cost spanning tree.
11 To implement Krushkal's algorithm to generate a min-cost spanning tree.
12 To implement Dijkstra's algorithm to find shortest path in the graph.

R PROGRAMMING LAB

II Year – I Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Implement the basic concepts and data structures of R.
2. Implement loops and functions in R
3. Implement mathematical functions and handling files
4. Apply the different distributions
5. Use various graphical tools in R
6. Describe the properties of discrete and continuous distribution functions

Concepts to be covered:

Introduction, How to run R, R Programming Structures, Control Statements, Loops, , Functions, Recursion, Doing Math and Simulation in R, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files, Creating Graphs, Saving Graphs to Files, Probability Distributions, Correlation and Covariance, Linear Models.

LIST OF EXPERIMENTS:

Exercise 1: Introduction to R Programming

Exercise 2: Getting Used to R: working with Data structures

Exercise 3: Using Conditional & Iterative Statements in R

Exercise 4: Working with functions

Exercise 5: Doing Math and Simulation in R

- Math Functions
- Calculus
- Linear algebraic operations
- Set operations

Exercise 6: Reading in Your Own Data

- Working with files
- Accessing the Keyboard and Monitor,

Exercise 7: Data visualization

- Charts and plots
  - Find the mean, median, standard deviation and quintiles of a set of observations.
- Students may experiment with real as well as artificial data sets.

Exercise 8: Probability Distributions.

- Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of Normal, binomial and Poisson distributions.
- Students are expected to generate artificial data using and explore various distribution and its properties. Various parameter changes may be studied.

Exercise 9: Correlation

Calculate the correlation between two variables.
Use the scatter plot to investigate the relationship between two variables

Exercise 10: Fitting a straight line of type y=a+bx

- A Statistical Model for a Linear Relationship
- The R Function: lm

TEXT BOOKS:

1) Statistical Learning using R, WHITTON

2) The Art of R Programming, A K Verma, Cengage Learning.

3) R for Everyone, Lander, Pearson

4) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCES:

1) R Cookbook, Paul Teetor, Oreilly.

2) R in Action, Rob Kabacoff, Manning

Indian Constitution

II Year – I Semester

Lecture: 2	Practical: 0	Internal Marks: -
Credits: 0	Tutorial: 0	External Marks: -

PREREQUISITES: -

COURSE OUTCOMES:

At the end of the course, the student will be able to have a clear knowledge on the following:

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

SYLLABUS:

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

Technical Seminar

II Year – I Semester

Lecture: 1	Practical: 0	Internal Marks: -
Credits: 1	Tutorial: 0	External Marks: -

The Student Shall give a detailed presentation of any technical topic in the domain of Computer Science and Engineering which shall be evaluated by the Department committee.

II YEAR
SEMESTER-II
SYLLABUS

Discrete Mathematical Structures

II Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

SYLLABUS:

UNIT-I

Mathematical Logic: Introduction, Statements and Notation, Connectives, Normal forms, Theory of inference for Statement Calculus, The Predicate Calculus, Inference theory of Predicate calculus.

UNIT-II

Set Theory: Introduction, Basic concepts of set theory, Principle of Inclusion and Exclusion, Properties of Binary relations, Relation matrix and Digraph, operations on relations, Partition and covering, Transitive closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, Bijective functions, Inverse functions, Composition of functions, Recursive functions, Pigeonhole principle and its applications.

UNIT-III

Algebraic Structures: Algebraic systems and examples, general properties, semigroup, monoid, groups and subgroups.

Number Theory: Properties of integers, Division algorithm, The greatest common divisor, Euclidean algorithm (without proof), Least common multiple, testing of prime numbers, The fundamental theorem of Arithmetic, Fermat's theorem and Euler's theorem (without proofs) and its applications.

UNIT-IV

Combinatorics and Recurrence Relations: Basic counting principles- sum rule, solving recurrence relations by substitution and by the method of characteristic roots.

UNIT -V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems withoutProofs).

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblayand P. Manohar, Tata McGraw Hill
3. Mathematical Foundation for Computer science, S. Santha, E.V. Prasad, Cengage publications.

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REFERENCE BOOKS:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H.Rosen, 7th Edition, Tata McGraw Hill.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler

Ross, PHI. 3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

DATA BASE MANAGEMENT SYSTEMS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Describe a database and different database models
2. Design Entity Relationship models And Relational Model
3. Design and implement queries using Structured Query Language
4. Design database schema using normalization.
5. Understand the characteristics of database transaction management.

SYLLABUS:

Unit – I:

Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, and Database applications. Brief introduction of different Data Models- the ER Model – Relational Model – Other Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure.

Unit – II:

Entity Relationship Model: Introduction, Representation Of Entities, Attributes, Entity Set, Relationship, Relationship Set, Constraints, Sub Classes, Super Class, Inheritance, Specialization, And Generalization Using ER Diagrams.

Relational Model: Introduction to Relational Model, Concepts of Domain, Attribute, Tuple, Relation, Importance Of Null Values, Constraints (Domain, Key Constraints, Integrity Constraints) And Their Importance

Unit – III:

SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion), Creating tables

with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering.

Implementation of different types of joins, view(updatable and non-updatable), relational set operations, Definition of NOSQL, History of NOSQL and Different NOSQL products, Applications, features of NoSQL, Difference between SQL and NoSQL

Unit-IV

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Indexing: Hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

Unit-V

Transaction Management And Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint, Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods: lock granularity, lock types, two-phase locking for ensuring serializability, deadlocks.

Recovery System: Introduction to ARIE, The Log, The Write-Ahead Log Protocol, check pointing, Recovery from system crash

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.

2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.

3. C.J.Date, "*Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

4. Professional NOSQL" by Shashank Tiwari, 2011, WROX Press.

REFERENCES:

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7th Edition, Pearson Education, 2000.

2. ElmasriNavrate, *"Fundamentals of Database Systems"*, 5th Edition, Pearson Education, 2007.

COMPUTER ORGANIZATION & ARCHITECTURE

II Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

PREREQUISITES: -DLD

COURSE OUTCOMES:

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

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shiftmicro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input –Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

OPERATING SYSTEMS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1.Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.

2. Apply synchronization to cooperating processes and handle the deadlocks

3. Learn various management techniques for efficient utilization of system memory.

4. Understand and analyze theory andimplementation offiles and Evaluate different disk scheduling algorithms.

5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

Managerial Economics & Financial Analysis

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

COURSE OUTCOMES:
At the end of this course the student will able to:

- The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand.
- One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs.
- One has to understand the nature of different markets and Price Output determination under various market conditions.
- One should equipped with the knowledge of different Business Units
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

SYLLABUS

UNIT – I:
Introduction to Managerial Economics and demand Analysis:
Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Demand forecasting and its Methods.

UNIT – II:
Production and Cost Analyses:
Production function-Isoquants and Isocosts-Law of Variable proportions- Cobb-Douglas Production function-Economics of Sale-Cost Concepts- Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis-Determination of Break-Even Point (Simple Problem).

UNIT – III:
Introduction to Markets, Theories of the Firm & Pricing Policies:
Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models –

Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements- Analysis and Interpretation of Financial Statements

Capital Budgeting: Meaning of Capital Budgeting-Need for Capital Budgeting- Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS :

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES :

1. V. Maheswari : Managerial Economics, Sultan Chand.
2. Suma Damodaran : Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. VanithaAgarwal : Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja : Financial Accounting for Managers, Pearson.
6. Maheswari : Financial Accounting, Vikas Publications.
7. S. A. Siddiqui & A. S. Siddiqui : Managerial Economics and Financial Analysis, New Age International Publishers, 2012.

PROFESSIONAL ETHICS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:

- To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
- Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Principles for Harmony
Truthfulness – Customs and Traditions – Value Education – Human Dignity – Human Rights – Fundamental Duties – Aspirations and Harmony (I, We & Nature) – Gender Bias – Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.
UNIT II: Engineering Ethics and Social Experimentation:
History of Ethics – Need of Engineering Ethics – Senses of Engineering Ethics – Profession and Professionalism – Self Interest – Moral Autonomy – Utilitarianism – Virtue Theory – Uses of Ethical Theories – Deontology – Types of Inquiry – Kohlberg's Theory – Gilligan's Argument – Heinz's Dilemma – Comparison with Standard Experiments – Learning from the Past – Engineers as Mangers – Consultants and Leaders – Balanced Outlook on Law – Role of Codes – Codes and Experimental Nature of Engineering.
UNIT III: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety – Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk – Consequences – Risk Assessment- Accountability- Liability – Reversible Effects – Threshold Levels of Risk – Delayed v/s Immediate Risk – Safety and the Engineer – Designing for Safety- Risk – Benefit Analysis- Accidents.
UNIT IV: Engineers' Duties and Rights:
Concept of Duty – Professional Duties- Collegiality- Techniques for Achieving Collegiality – Senses of Loyalty- Consensus and Controversy – Professional and Individual Rights – Confidential and Proprietary Information – Conflict of Interest – Ethical egoism – Collective Bargaining – Confidentiality – Gifts and Bribes – problem solving – Occupational Crimes – Industrial Espionage – Price Fixing – Whistle Blowing.
UNIT V: Global Issues:
Globalization and MNCs – Cross Culture Issues – Business Ethics – Media Ethics- Environmental Ethics – Endangering Lives – Bio Ethics – Computer Ethics – War Ethics – Research Ethics – Intellectual Property Rights.

Outcome:

- It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.

- It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – Tata McGraw – Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, Dharanikota Suyodhana – Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S.B.Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Enginnering Ethics & Human Values by M.Govindarajan, S. Natarajan and V.S.Senthil Kumar – PHI Learning Pvt.Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M.Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof. D.R.Kiran – Tata McGraw – Hill – 2013.
9. Human Values and Professional Ethics by Jayshree Suresh and B.S. Raghavan, S.Chand Publications.

DATA BASE MANAGEMENT SYSTEMS LAB

II Year – II Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

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

1. Create own database.
2. Manipulate data in database using SQL language.
3. Experiment with various SQL queries with database created
4. Write programs using PL/SQL language.
5. Create triggers using PL/SQL.

LIST OF LAB EXPERIMENTS:

1. Introduction to SQL: DDL, DML, DCL, TCL.
2. Queries for Creating Tables with Constraints, Views.
3. Example SQL Queries using select.
4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN).
5. Queries using Group By, Order By, and Having Clauses and Working with Index, Sequence, Synonym.
6. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
7. Queries on Joins and Correlated Sub-Queries.
8. Write a PL/SQL Code using Basic Variable, Anchored declarations, and Usage of Assignment Operation.
9. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL.
10. Write a PL/SQL block using SQL and Control Structures in PL/SQL.
11. Write a PL/SQL Code using Cursors, Exceptions and Triggers.
12. Write a PL/SQL Code using Procedures, Functions, and Packages.

TEXT BOOKS :

1) ORACLE PL/SQL by example. Benjamin Rosenzweig, ElenaSilvestrova, Pearson
2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, TMH.
3) SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.
4) Data Base Management System, Oracle SQL and PL/SQL, Pranabkumar Das Gupta, P Radha Krishna, PHI.

OPERATING SYSTEMS &LINUX PROGRAMMING LAB

II Year – II Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES: C programming

COURSE OUTCOMES:

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

1. Implement various basic functionalities of operating systems

2. Illustrate kernel functionalities using LINUX

LIST OF LAB EXPERIMENTS:

Operating Systems:

1. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate Bankers Algorithm for Dead Lock Avoidance
3. Simulate Bankers Algorithm for Dead Lock Detection.
4. Simulate the placement algorithms in Multiprogramming
5. Simulate the following page replacement algorithms: a) FIFO b) LRU c) Optimal
6. Simulate the following File allocation strategies: a) Sequenced b) Indexed c) Linked

Linux Programming:

1. a) Study of Unix/Linux general purpose utility command list:man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.

   b) Study of vi editor.c) Study of Bash shell, Bourne shell and C shell in Unix operating system.

2. Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program to emulate the UNIX ls –l command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe.Ex: - ls –l | sort
5. Write a C program that illustrates two processes communicating using shared memory
6. Write a C program to simulate producer and consumer problem using semaphores
7. Write C program to create a thread using pthreads library and let it run its function.
8. Write a C program to illustrate concurrent execution of threads using pthreads library.

PYTHON PROGRAMMING LAB

II Year – II Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES:

COURSE OUTCOMES:

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

1. Structure simple Python programs for solving problems.
2. Decompose a Python program into functions.
3. Represent compound data using Python lists, tuples, and dictionaries.
4. Read and write data from/to files in Python Programs.
5. To build software for real needs.

Concepts to be covered:

- **Introduction:**Variables,Assignment,Keywords, Comments, Input-Output, Indentation
- **Types, Operators and Expressions:** Datatypes, Operators, Control flow statements
- **Data Structures:** Lists, Tuples, Sets, Dictionary,Sequences,Comprehensions
- **Functions**: Types of Arguments, Anonymous, Fruitful and Lambda Functions.
- **Python Packages**: Installation and Importing packages, Brief tour of packages like System, math, random, date and time, Numpy, Matplotlib, Multi-threading, scikit-learn and Internet Access.
- **OOPs using Python**
- **Exception handling in python**

Lab Exercises:

1. Write a program to perform various list of operations(eg: Arithmetic,logical,bitwise etc) in python.
2. Write a program to implement control flow statements.
3. Write a programs implementing various predefined function of Lists,Sets,Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.

6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors .
9. Writea program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen vales and vectors, determinant for a matrix.
12. Write a program to read a file.
13. Write a program to use System,mathetc packages.
14. Write a program for visualizing the data using matplotlibpackage .
15. Write a program to access data from the web and validate it.
16. Write a program to perform multi threading.

TEXT BOOKS

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. “Python in easy steps In Easy Steps”, Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.
6. “Introduction to Programming Concepts with Case Studies in Python”, GöktürkÜçoluk Sinan Kalkan, Springer

III YEAR

SEMESTER-I

SYLLABUS

DATA MINING AND WAREHOUSING

III Year - I Semester **Course Code: 18IT5T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Identify the scope and necessity of Data Mining & Warehousing for the society.

2) Describe the design of Data Warehousing so that it can be able to solve the root problems.

3) To understand various tools of Data Mining and their techniques to solve the real time problems.

4) To develop ability to design various algorithms based on data mining tools.

5) To develop further interest in research and design of new Data Mining Techniques.

COURSE OUTCOMES:

1) Design data warehouse with dimensional modeling and apply OLAP operations.

2) Understand the Data Mining Principles and need of preprocessing

3) Compare and evaluate different data mining techniques like classification and prediction.

4) Identify the frequent patterns from transactional data.

5) Compare and evaluate different clustering techniques.

SYLLABUS

UNIT-I

Data Warehouse: Basic Concepts: What is a Data Warehouse? Differences between Operational Databases system (OLTP) and Data warehouses (OLAP). Data warehousing: A Multitier Architecture, Fundamentals of ETL architecture, Data Warehouse Design Methodology, Data Warehouse Modeling: Data Cube: A Multidimensional Data Model, Data Marts and Star Schema Design.

UNIT-II

Data Mining: Introduction: Data mining on What Kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Data Objects and Attribute Types.

Data Preprocessing: Why Preprocess the Data? Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization

UNIT-III

Classification and Prediction: Basic concepts: What is Classification? General Approach to solving a Classification problem. Decision Tree Induction: Working of Decision Tree, building a Decision Tree, methods for expressing an Attribute test Conditions, measures for selecting the best split, Algorithm for Decision Tree Induction.

Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification, Bayesian Belief Networks, K-Nearest-Neighbor Classifiers.

UNIT-IV

Association Analysis: Basic Concepts and Algorithms: Problem Defecation. Frequent Item Set generation: The Apriority Principle, Frequent Item set Generation in the Apriori Algorithm, Candidate Generation and Pruning, Support counting. Rule generation: Confidence- Based Pruning, Rule Generation in Apriori Algorithm. Compact Representation of Frequent Item sets: Maximal Frequent Item sets, Closed Frequent Item sets. FP-Growth Algorithm: FP Tree Representation, Frequent Itemset Generation in FP-Growth Algorithm.

UNIT-V

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm

DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.

TEXT BOOKS:

1) Jiawei Han Micheline Kamber, "Data mining & Techniques", Morgan Kaufmann Publishers. (Units 1,2, 3)

2) Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining", Pearson Publications (Units 4, 5)

REFERENCES:

1) S.N.Sivanandam, S.Sumathi, "Data Mining – Concepts, Tasks and Techniques", Thomson

2) Ralph Kimball, "The Data Warehousing Toolkit", Wiley.

3) Margaret H. Dunham, "Data mining - Introductory and advanced topics", Pearson Education.

4) D.Hand, H. Mannila and P.Smyth, "Principles of Data mining", PHI (2001).

WEB TECHNOLOGIES

III Year – I Semester **Course Code: 18IT5T02**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web.
2) The course will introduce web-based media-rich programming tools for creating interactive web pages.

COURSE OUTCOMES:

1) Analyze a web page and identify its elements and attributes.
2) Create web pages using HTML and Cascading Styles sheets.
3) Build dynamic web pages and client-side scripts using AJAX
4) Build web applications using PHP.
5) Develop interactive web pages that include databases

SYLLABUS

UNIT-I

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.HTML Common tags: List, Tables, images, forms, frames, HTML5, Cascading Style Sheets (CSS) & its Types, Style Specification Formats, Selector Forms, CSS3 modules

UNIT-II

Java Script: Introduction to Java Script, Declaring variables, Event handlers (onclick, onsubmit, etc.,) and Form Validation. Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Pattern Matching using Regular

Expressions, DHTML: Positioning Moving and Changing Elements

UNIT-III

XML: XML Syntax, Namespace in XML, Document type Definition, XML schemas, XSLT,DOM and SAX Approaches. **AJAX A New Approach:** Introduction to AJAX.

UNIT-IV:

PHP Programming:

Introducing PHP: Creating PHP script, Running PHP script, working with variables and constants: Using variables Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases.

UNIT-V

MySQL: Introduction to MySQL, Data types, Queries, Applying Filters, Usage of Grouping and Sort, SET Operators, CRUD operations, Joins, Integration of MySQL with PHP.

TEXT BOOKS:

1) Programming the World Wide Web, Robert W Sebesta, 7ed, Pearson.(Unit 1,2,3)
2) Web Technologies, Uttam K Roy, Oxford publications (Units 1,2 3)
3) The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill.(Unit 4)
3) MySQL The Complete Reference - VikramVaswani McGraw Hill.(Unit 5)

REFERENCES:

1) Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2) Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3) Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4) An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning

DESIGN AND ANALYSIS OF ALGORITHMS

III Year – I Semester **Course Code: 18IT5T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Reinforce basic design concepts (e.g., Pseudocode, specifications, top-down design)
2) Knowledge of algorithm design strategies
3) Ability to analyze time and space complexity

COURSE OUTCOMES:

1. Understand the performance Analysis of an Algorithm using Space and Time Complexities
2. Describe, apply and analyze the complexity of divide and conquer strategy.
3. Synthesize efficient Algorithms for common engineering problems using Greedy Method.
4. Apply and analyze the complexity of dynamic programming strategy.
5. Ability to solve complex problems using Back Tracking and Branch & Bound.

SYLLABUS

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Solving Recurrence relations.

UNIT-II

Divide and Conquer Method: General Method, Applications: Binary search, Quick sort, Merge sort, Defective Chessboard.

UNIT-III

Greedy Method: General method, Applications: Minimum cost spanning tree (Prim's and Kruskal's Algorithms), Single source shortest paths, Fractional Knapsack Problem, Job Sequencing with Deadlines.

UNIT-IV

Dynamic programming: General Method, Applications: Optimal Binary Search Tree, String Editing, 0/1 knapsack, Travelling salesman problem.

UNIT V

Back tracking: General Method, Applications: Sum of Subsets, Hamiltonian Cycles.

Branch and bound: General Method, Applications:0/1 Knapsack problem, travelling salesman problem.

Introduction to NP-Hard & NP-Complete Problems – Basic Concepts, Cook's Theorem.

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

REFERENCES:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

3. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. PHILearning.

FORMAL LANGUAGES AND AUTOMATA THEORY

III Year – I Semester **Course Code: 18IT5T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Introduce the student to the concepts of Theory of computation in computer science.
2) The students should acquire insights into the relationship among formal languages, formal Grammars and automata.

COURSE OUTCOMES:

1) Understand the basic concepts of Automata Theory
2) Infer the equivalence of languages described by finite automata and regular expressions.
3) Devise regular, context free grammars while recognizing the strings and tokens and able to Normalize grammars.
4) Apply Pushdown Automata for problem solving.
5) Understand basic properties and compute using Turing Machines.

SYLLABUS

UNIT-I

Finite Automata: Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines.

UNIT-II

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma,

Closures Properties, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-III

Context Free Grammars: Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

UNIT-IV

Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata.

UNIT-V

Turning Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Types of Turing Machines

TEXT BOOKS:

1) Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008. (Units 1, 2, 3, 4, 5).
2) Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007. (Units (1, 2, 3, 4, 5).

REFERENCES:

1) Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2) Introduction to Automata Theory, Formal Languages and Compuation, Shyamatendukandar, Pearson, 2013.

3) Theory of Computation, V.Kulkarni, Oxford University Press, 2013.

4) Theory of Automata, Languages and Computation, Rajendra Kumar, McGrawHill.

(PROGRAM ELECTIVE-I)
INTERNET OF THINGS

III Year – I Semester **Course Code: 18IT5T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram " Internet of Things" Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley andSons2014.

(PROGRAM ELECTIVE-I)

UNIX & SHELL PROGRAMMING

III Year – I Semester **Course Code: 18IT5T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Written technical communication and effective use of concepts and terminology.
2) Facility with UNIX command syntax and semantics.
3) Ability to read and understand specifications, scripts and programs.
4) Individual capability in problem solving using the tools presented within the class
5) Students will demonstrate a mastery of the course materials and concepts within in class discussions.

COURSE OUTCOMES:

1) Create powerful data processing applications using UNIX shell and commands
2) Manage data, files and programs at command line using UNIX
3) Create and modify data files and documents using editors and tools
4) Demonstrate knowledge of creating new commands.
5) Develop Scripts and programs that demonstrate effective use of structured programming.

SYLLABUS

UNIT-I

Introduction to UNIX-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-PATH, man, echo, who, date, stty, pwd ,cd, mkdir, rmdir, cp, mv, rm, cat, more, wc, tar, kill, sleep.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, ls command with options-File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Introduction to Basic Regular Expressions -The Grep Command with options-EGrep and FGrep Commands, The Stream Editor Sed Command with options-The AWK command- awk preliminaries, awk using print and printf.

UNIT-IV

Simple Filtering commands: pr, cmp, comm, diff, head tail, cut, paste, sort - Meta characters-Creating New Commands -More on I/O Redirection- Command Substitution-Giving Multiple commands- Command Line Structure.

UNIT-V

Shell Programming-Shell Variables-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The Sleep Command-Debugging Scripts-The Script Command.

TEXT BOOKS:

1. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.(Units 1,2,3,4,5)
2. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.(Unit 2,4)

REFERENCE BOOKS:

1. Unix and shell programming by B.M. Harwani, OXFORD university press.
2. UNIX and Shell Programming by Behrouz A. Forouzan, Richard F. Gilverg

(PROGRAM ELECTIVE- I)

AGILE TECHNOLOGIES

III Year – I Semester **Course Code: 18IT5T07**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. To have an understanding of the Agile Manifesto and Principles
2. To Apply Agile based techniques in each of the development phases.

COURSE OUTCOMES:

1. Understand the Agile Manifesto and Principles.
2. Apply agile software development practices to create high-quality software.
3. Acquire Knowledge on software design, set of software technologies and APIs.
4. Examine and demonstrate knowledge of Agile development
5. Demonstrate the Agile Approach to estimate project variables, control and Risk Management

SYLLABUS

UNIT-I

Agile Software Development: Genesis of Agile, Introduction and Background, Traditional Model Vs Agile Model, Values of Agile, Agile Manifesto and Principles, Stakeholders, Challenges.

UNIT-II

Lean Approach: Waste Management, Kaizen and Kanban, Add process and products add Value, Roles related to life cycle, Differences between Agile and Traditional Plans, Differences at different life cycle phases, Key techniques, Principles, Understand as a means of assessing the initial status of the project, How agile helps to build quality.

UNIT-III

Agile Scrum Framework: Introduction to Scrum, Project phases, Agile estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, **Agile Requirements:** User story definition, Characteristics and contents of user stories, Acceptance tests and verifying stories, Product Velocity,

Burn down chart, Sprint planning and retrospective, Daily Scrum, Scrum roles- Product Owner, Scrum Master, Scrum Team, Scrum Case Study, Tools for Agile Project Management.

UNIT-IV

Agile Software Design and Development: Agile Design practices, Role of design principles including Single Responsibility principle, Open Closed Principle, Liskov Substitution principle, Interface Segregation principles, Dependency Inversion principle in Agile Design, Refactoring- Need and significance, Refactoring techniques, Continuous Integration, Automated Build tools, Version Control.

UNIT-V

Agile Testing and Review: Agile Testing Techniques, Test Driven Development, User Acceptance Test, Agile Metrics and Measurements, The Agile Approach to estimate project variables, Agile control- The 7 control parameters, Agile Approach to Risk, Agile approach to Configuration Management, Atern Principles and Philosophy, Best practices to manage Scrum.

TEXT BOOKS:

1. Robort C. Martin, Agile Software Development- Principles, Patterns and Practices, Prentice Hall, 2013(Units 1, 3, 5)
2. Ken Schawber, Mike Beedle, Agile Software Development with Scrum, Pearson(Units 3,4)
3. Mike Cohn, Succeeding with Agile: Software Development Using Scrum, Addison Wesley Series.(Units 3, 4)

REFERENCES:

1. David J. Anderson and Eli Schragenheim,―Agile Management for SoftwareEngineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.
2. Hazza and Dubinsky, ―Agile Software Engineering, Series: Undergraduate Topics in Computer Science, Springer,.
3. Craig Larman, ―Agile and Iterative Development: A Managers Guide, Addison-Wesley.
4. Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann.

DATA MINING LAB

III Year – I Semester **Course Code: 18IT5L16**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits:1.5 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

1. Practical exposure on implementation of well known data mining tasks.
2. Exposure to real life data sets for analysis and prediction.
3. Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.
4. Handling a small data mining project for a given practical domain.

COURSE OUTCOMES:

1. Learn about WEKA tool and its applications
2. Extract knowledge using Data Mining techniques.
3. Adapt to new Data Mining tools.
4. Explore recent trends in Data Mining such as Web mining,spatial-temporal mining,

LIST OF EXPERIMENTS

1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses.arff using apriori Algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using Random Tree algorithm
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k- means.

WEB TECHNOLOGIES LAB

III Year – I Semester **Course Code: 18IT5L17**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Knowledge of HTML, Java Script and XML to develop web applications

2) Understanding about JDBC connections and Java Mail API

3) Acquire Knowledge of the design and development process of a complete web application

LIST OF LAB EXPERIMENTS

1. Design the following static web pages required for an online book store web site.
i) HOME PAGE: The static homepage must contain three frames. ii) LOGIN PAGE iii) REGISTRATION PAGE IV) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.
2. Write JavaScript to validate the following fields of the Registration page.
I). First Name (Name should contain alphabets and the length should not be less than 6 characters).
ii).Password (Password should not be less than 6 characters length).
iii). E-mailid (should not contain any invalid and must follow the standard pattern name@domain.com)
iv). Mobile Number (Phonenumbershouldcontain10digitsonly).
v).Last Name and Address (should not be Empty).
3. Develop and demonstrate the usage of inline, internal and external style sheet usingCSS
4. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:
i) Input: Click on Display Date button using onclick()function Output: Display date in the textbox

ii) Input: A number n obtained using prompt Output: Factorial of n number using alert

iii) Input: A number n obtained using prompt Output: A multiplication table of numbersfrom1 to 10of n using alert

iv) Input: A number n obtained using prompt and add another number using confirmOutput: Sum of the entire n numbers using alert

5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

6. Write an HTML page including any required JavaScript that takes a number from text field in the range of0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

7. Create an XML document thatcontains10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAXparser.

8. Develop and demonstrate PHPScript for the following problems:

i) Write a PHP Script to find out the Sum of the Individual Digits.

ii) Write a PHP Script to check whether the given number is Palindrome or not

9. Implement the following web applications using (a) PHP

i) A web application that takes a name as input and on submit it shows a hello page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You message with the duration of usage (hint: Use session to store name and time).

ii) Write a PHP Program to display current Date, Time and Day.

iii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello, you are not authorized to visit the site” message, where should be replaced with the entered name. Otherwise it should send “Welcome to this site” message.

iv) A web application that lists all cookies stored in the browser on clicking"List Cookies" button. Add cookies if necessary.

10. Implement the web applications with Database using PHP

11. Modify the above PHP program to use an xmlinstead of database

12. Write a program to design a simple calculator using JavaScript and PHP

13. Installation and usage of XAMPP on the given operating system and get accustomed to usage of phpmyadmin.

14. Simple to complex queries in MySQL.

15. Examples using the integration of PHP with MySQL.

(Example1: Sign up form and login form)

(Example2: Construct a simple shopping cart by calculating price and reducing quantity dynamically.)

III YEAR

SEMESTER-II

SYLLABUS

COMPILER DESIGN

III Year – II Semester **Course Code: 18IT6T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The process involved in a compiler.
2) Create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
3) To apply the code generation algorithms to get the machine code for the optimized code.
4) What is syntax analysis, various types of parsers- top down approach, bottom up parsers.
5) Various aspects of the run-time environment into which the high-level code is translated.

COURSE OUTCOMES:

1) Acquire knowledge in different phases and passes of Compiler.
2) Demonstrate knowledge about scanning of tokens and perform the syntax analysis by using Top-down parsing techniques.
3) Perform the syntax analysis by using Bottom Up parsing techniques for more complex grammars.
4) Compare different memory management techniques in runtime environment.
5) Demonstrate knowledge about compiler generation tools and techniques.

SYLLABUS

UNIT–I

Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation.

Lexical Analysis: The role of lexical analyzer, Input buffering, specification of tokens. Recognition of tokens, The lexical analyzer generator - LEX.

UNIT–II Syntax Analysis: The Role of a parser, Context free Grammars, Writing a grammar, Top down parsing - Backtracking, LL (1) Grammars, Recursive descent parsing, Non – recursive Predictive parsing, Error recovery in Predictive Parsing.

Bottom up parsing: Reductions, Handle Pruning, Shift – Reduce Parsing, Conflicts during Shift – Reduce Parsing,

UNIT –III

Simple LR Parser – LR Parsing Algorithm, SLR - Parsing Table, Viable Prefixes.

More Powerful LR parser – Constructing Canonical LR1, LALR parsing tables, Using Ambiguous Grammars, Error Recovery in LR parser.

UNIT – IV

Intermediated Code Generation: Variants of Syntax trees, 3 Address code – Quadruples, Triples.

Runtime Environments: Stack allocation of space, Access to Non Local data on the stack, Heap Management.

UNIT – V

Code Generation: – Issues in design of code generation, the target Language, peephole Optimization, A simple Code Generator. Basic Blocks & Flow Graphs, Optimization of Basic Blocks – DAGs, Local Common sub expression elimination.

Machine independent code optimization:

The principle sources of Optimization: Global Common sub expression elimination - Constant folding - Copy propagation - Dead code elimination – Induction Variable & Strength reduction - Loop optimization - Procedure in-lining.

TEXT BOOKS:

1. Compilers – Principles, Techniques and Tools. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffery D. Ullman, 2nd edition, Pearson - 2007.

REFERENCE BOOKS:

1. Compiler Construction, Principles and practice, Kenneth C Louden, CENGAGE

2. Implementations of Compiler, A New approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

3. LEX & YACC – John R. Levine, Tony Mason, Doug Brown, O'reilly

4. Principles of compiler design, 2nd edition, Nandhini Prasad, Elsevier.

COMPUTER NETWORKS

III Year – II Semester **Course Code: 18IT6T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.

3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

4) Learn various IEEE standards for medium access.

5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP

2) Identify the different types of network topologies and protocols.

3) Compare and contrast methods to identify Errors and correct them.

4) Differentiate between various network routing algorithms.

5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division

multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOFTWARE ENGINEERING

III Year – II Semester **Course Code: 18IT6T03**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To grasp generic models to structure the software development process.
2) To understand core concepts of requirements engineering and requirements specification.
3) To recognize different notion of complexity at both the module and system level.
4) To be aware of some widely known design methods.
5) To understand the role and contents of testing activities in different life cycle phases.

COURSE OUTCOMES:

1) Understand the perspective of various software process models
2) Understand the Requirements Engineering Process and compile an SRS
3) Analyze the requirements and perform a Design
4) Apply testing principles on software project and understand the maintenance concepts.
5) Identify risks, manage the change to assure quality in software projects

SYLLABUS

UNIT-I

The Evolving Role of Software – Software – The changing Nature of Software – Legacy software – – A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process.

UNIT-II

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Designing the architecture. Assessment: Impact of Requirement Engineering in their problem. Decision Tables, SRS Document, IEEE Standards for SRS, Design: Architectural design, component level design, user interface design.

UNIT-III

Requirements Analysis – Analysis Modeling Approaches: Design Engineering – Design Process - Design Quality - Design Model - User Interface Design

Design: Modeling with UML, Use case Diagrams, Class Diagrams, Object Diagrams, Sequence Diagrams, Collaboration Diagrams, Component Diagrams, Deployment Diagrams

Coding standards, Coding Guidelines, Modern Programming Language features, Documentation Guidelines

UNIT-IV

Implementation and Testing: Quality concepts, Review techniques, Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing, Software Testing Strategies - Strategies: Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Testing conventional applications, Testing object oriented applications, and Testing Web applications.

UNIT-V

Project Management Concepts, Process and Project Metrics, Estimation for Software projects, Software Cost Estimation, Project Scheduling, Risk Management, Maintenance and Reengineering. Assessment: Preparation of Risk mitigation plan.

TEXT BOOKS:

1. "Fundamentals of Software Engineering", Rajib Mall, PHI Publication, 3rdedition.(Units 1,2,5)
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley.(Units 3,4)
3. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning(Units 3,5)

REFERENCES:

1. Roger S. Pressman, -Software Engineering: A Practitioner's Approach‖, McGraw Hill International edition, Seventh edition.
2. Stephan Schach, ―Software Engineering‖, Tata McGraw Hill.
3. Ian Sommerville, Software Engineering, 9th Edition, Pearson Publishers.

(PROGRAM ELECTIVE - II)

BUSINESS INTELLIGENCE

III Year – II Semester **Course Code: 18IT6T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Provide the comprehensive knowledge of Business Intelligence principles and techniques by introducing the relationship between managerial and technological perceptive.
2. Exposing the students to the frontiers of business intelligence-intensive big data computing and information systems.

COURSE OUTCOMES:

1. Understand the concepts and components of Business Intelligence (BI).
2. Understand the value of business Intelligence.
3. Discover the requirements need to design a business intelligence model.
4. Understanding a Business Intelligence Environment
5. Develop Business Models and Information Flow

SYLLABUS

UNIT-I

Business Intelligence and Information Exploitation: Why Business Intelligence? The Information Asset, Exploiting Information, Business Intelligence and Program Success,
What Is Business Intelligence? Actionable Knowledge

UNIT-II

The Value of Business Intelligence: The Information Asset and Data Valuation, Actionable Knowledge--Return on Investment, Business Intelligence Applications, The Intelligence Dashboard, Business Intelligence Adds Value

UNIT-III

Planning for Success: Initiating a Program, Business/Information Technology Partnership, Business Intelligence Success Factors, Team Building, Strategic versus Tactical Planning

UNIT-IV

The Business Intelligence Environment: The Business Case, The Business Intelligence Process, System Infrastructure, Information Access, Delivery, and Analysis, Services Management Issues

UNIT-V

Business Models and Information Flow: The Business Case, Information Processing and Information Flow, The Information Flow Model, Usage in Practice, Modeling Frameworks, Management Issues

TEXT BOOKS:

1. D. Loshin, Business Intelligence: The savvy manager‘s guide, Morgan Kaufmannpublishers,2003.

REFERENCE BOOKS:

1. M. Biere, Business intelligence for the enterprise, 2 ed.: IBM Press, 2003.
2. C. Howson, Successful Business Intelligence: Secrets to making Killer BI Applications, 1 ed.: McGraw-Hill 2007.

PROGRAM ELECTIVE - II)

UML & DESIGN PATTERN

III Year – II Semester **Course Code: 18IT6T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Introducing the Unified Process and showing how UML can be used within the process.
2. Presenting a comparison of the major UML tools for industrial-strength development.
3. Introduction to design patterns, practical experience with a selection of central patterns

COURSE OUTCOMES:

1. Identify the purpose and methods of use of common object-oriented design patterns
2. Select and apply these patterns in their own designs for simple programs
3. Represent the data dependencies of a simple program using UML
4. Represent user and programmatic interactions using UML
5. Create design documentation outlining the testable and complete design of a simple Program

SYLLABUS

UNIT-I

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key Abstractions and Mechanisms.

UNIT-II

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT-III

Basic Behavioural Modelling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

Architectural Modelling: Component, Deployment, Component diagrams and Deployment diagrams

UNIT-IV

Patterns: Pattern Description, organizing catalogues, role in solving design problems

Creational Patterns: Abstract factory, Builder,

Structural Patterns: Bridge, Decorator, Flyweight,

UNIT-IV

Behavioral Patterns: Chain of responsibility, Command, Interpreter, Observer, Strategy, Iterator, Mediator.

TEXT BOOKS:

1. "The Unified Modelling Language User Guide", Grady Brooch, James Rumbaugh,Ivar Jacobson, 12 th Impression, 2012, PEARSON. (Units 1,2,3)

2. Design Patterns, Erich Gamma, Pearson Education, 1995.(Units 4,5)

REFERENCE BOOKS:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI.

2. "Head first object-oriented analysis and design", Brett D. McLaughlin,GaryPollice, Dave West, O"Reilly

3. "Object-oriented analysis and design with the Unified process", JohnW.Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning

4. "The Unified modeling language Reference manual", James Rumbaugh, IvarJacobson, Grady Booch, Addison-Wesley.

(PROGRAM ELECTIVE - II)
ADVANCED JAVA PROGRAMMING

IV Year – I Semester **Course Code: 18IT7T06**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1. Construct an Application using collection framework.
2. Able to install and use Web Servers and understand how communication happens in a web application.
3. Construct a Web Application using Servlets.
4. Construct a Web application using Java Server Pages.
5. Construct an enterprise application using Entity Beans linked with Database

COURSE OUTCOMES:

1. Apply the advanced concepts of Java including JDBC, Servlets, JSP, Java Beans, etc.
2. Able to install and use Web Servers and understand how communication happens in a web application.
3. Construct a Web Application using Servlets.
4. Construct a Web application using Java Server Pages
5. Construct an enterprise application using Entity Beans linked with Database

SYLLABUS

UNIT-I

Generics and Collections: Introduction to collection, Collections API, Set Example, List Example, Map Interface, Generics. Review of HTML4: Common tags, HTML Tables and formatting internal linking, Complex HTML forms.

UNIT-II

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans API

UNIT-III

Introduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, Thejavax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.serveletHTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, servlet chaining-Security Issues.

UNIT-IV

Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSPProcessing. JSP Application Design with MVC JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing. Sharing Data between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data

UNIT-V

Database Access : Database Programming using JDBC Studying Javax.sql. package. Accessing MySql database- Accessing MS Access database- Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page. Introduction to struts framework.

TEXT BOOKS:

1. Internet and World wide web- How to program ,Dietel and Nieto , Pearson.(Unit 1)
2. The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH.(Unit 1,2,3)
3. Java Server Pages , Hans Bergstan, Oreilly (Unit 4,5).

REFERENCE BOOKS:

1. Jakarta Struts cook book, Bill Siggelkow, SPD, Oreilly
2. Murach's, Beginning Java JDK5, Murach, SPD.
4. Web application technologies concepts, Knuckles, John Wiley.
5. Programming world wide web, Sebesta, Pearson

COMPUTER NETWORKS LAB

III Year – II Semester **Course Code: 18IT6L21**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

1. To teach students practical orientation of f networking concepts
2. To teach students various forms of IPC through UNIX and socket Programming

COURSE OUTCOMES:

1. Implement programs on networking concepts using various services.
2. Implement networking applications using IPC mechanism of UNIX.
3. Compare routing algorithms.
4. Understand the working principles of various communication services using protocols.
5. Practice packet/file transmission between nodes.

LIST OF EXPERIMENTS

1. Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(), connect(), send(), recv(),sendto(),recvfrom()).
2. Implement the data link layer farming methods such as character stuffing and bitstuffing.
3. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4. Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
5. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node usingdistance vector routing algorithm
6. Take an example subnet of hosts. Obtain broadcast tree for it.
7. Design TCP iterative Client and server application to reverse the given input sentence
8. Design UDP Client and server application to reverse the given input sentence
9. Implementation of gesockopt (), setsockopt () system calls.
10. Implementation of SMTP.

SOFTWARE ENGINNERING LAB

III Year – II Semester **Course Code: 18IT6L22**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Prepare SRS document, design document, test cases and software configuration management and risk management related document.
2) Develop function oriented and object oriented software design using tools like rational rose.
3) Design and develop Test Cases for a system
4) Track the progress of a project using various tools.

1. LIST OF LAB EXPERIMENTS

1) Create the problem statement for a specific system of relevance
2) Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3) To carry out the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4) To draw UML Diagrams for a suggested system
5) To illustrate the test cases, test case preparation and perform Manual Tests.
6) Perform Estimation of effort using FP Estimation for chosen system.
7) To prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Note: Students shall prepare a document related to all the above activities for at least one real time Case Study

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

III Year – II Semester **Course Code: 18IT6T12**

Lecture: 2 Practical: 0

Credits: 0 Tutorial: 0

COURSE OBJECTIVES:

1) The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2) To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3) The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4) To know the student traditional knowledge in different sector.

COURSE OUTCOMES:

1) Understand the concept of Traditional knowledge and its importance
2) Know the need and importance of protecting traditional knowledge
3) Know the various enactments related to the protection of traditional knowledge.
4) Understand the concepts of Intellectual property to protect the traditional knowledge
5) Evaluate strategies to increase the protection of TK.

SYLLABUS

UNIT-I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act); **B:** The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

UNIT-IV

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

REFERENCES:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

IV YEAR

SEMESTER-I

SYLLABUS

BIG DATA & HADOOP

IV Year – I Semester **Course Code: 18IT7T01**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Optimize business decisions and create competitive advantage with Big Data analytics
2) Introducing Java concepts required for developing map reduce programs
3) Derive business benefit from unstructured data
4) Imparting the architectural concepts of Hadoop and introducing map reduce paradigm

COURSE OUTCOMES:

1) Understand methods for data summarization, query, and analysis.
2) Apply data modeling techniques to large data sets
3) Creating applications for Big Data analytics
4) Building a complete business data analytic solution.
5) Understand programming tools PIG & HIVE in Hadoop eco-system.

SYLLABUS

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; **Generics:** Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Data node, Secondary Name node, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

UNIT-V

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin
Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

TEXT BOOKS:

1) Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC (Unit 1)
2) Hadoop: The Definitive Guide by Tom White, 3 Edition, O'reilly(Unit 2,3,4)
3) Hadoop in Action by Chuck Lam, MANNING Publ.9(Unit 2)
4) Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss (Unit 5)

REFERENCE BOOKS:

1) Hadoop in Practice by Alex Holmes, MANNING Publ.
2) Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne

E-COMMERCE

IV Year – I Semester **Course Code: 18IT7T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
2. Identify the essential processes of an e-commerce system.
3. Identify several factors and web store requirements needed to succeed in e-commerce.
4. Understand the main technologies behind e-commerce systems and how these technologies interact.
5. Define various electronic payment types and associated security risks and the ways to protect against them.

COURSE OUTCOMES:

1. Identify and analyze stake holder needs
2. Understand electronic payment systems
3. Acquire Knowledge on Intra organizational commerce
4. Design and prepare marketing strategies for corporate digital Library
5. Design and prepare accurate e-commerce related presentations of multimedia information taking into account technical and aesthetic considerations;

SYLLABUS

UNIT–I

Electronic Commerce-Frame work, the anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce – Mercantile Process models.

UNIT–II

Electronic payment systems– Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter-Organizational Commerce – EDI, EDI Implementation, Value-added networks.

UNIT–III

Intra Organizational Commerce – Work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT – IV

Corporate Digital Library – Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing – Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT – V

Consumer Search and Resource Discovery – Information search and Retrieval, Commerce Catalogues, Information Filtering Multimedia – key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

TEXT BOOKS:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.(Units 1,2,3,4,5)

REFERENCES:

1. Electronic Commerce – Gary P.Schneider – Thomson.
2. TheE-Commerce – Business, Technology, Society, Kenneth C.Taudon,CarolGuyericoTraver.
3. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.

(PROGRAM ELECTIVE-III)
INFORMATION RETRIEVAL SYSTEMS

IV Year – I Semester **Course Code: 18IT7T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1. To learn the different models for information storage and retrieval
2. To learn about the various retrieval utilities
3. To understand indexing and querying in information retrieval systems

COURSE OUTCOMES:

1. Understand the storage and retrieval of textual documents using appropriate models.
2. Apply various retrieval utilities for improving search.
3. Understand indexing and compressing documents to improve space and time efficiency
4. Formulate SQL like queries for unstructured data.
5. Understand the issues involved in providing an IR service on a web scale, including distributed index construction and user modeling for recommendation engines.

SYLLABUS

UNIT-I

Introduction Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model Language Models.

UNIT-II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT-III

Retrieval Utilities: Semantic networks, parsing. Cross-Language Information Retrieval: Introduction, crossing the language barrier.

UNIT-IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection

UNIT-V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema. Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

TEXT BOOKS:

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2nd Edition (Distributed by Universities Press), 2004.(Units 1,2,3)
2. Modern Information Retrival By Yates Pearson Education.(Units 4,5)

REFERENCE BOOKS:

1. Gerald J Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000.
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002.
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009.

(PROGRAM ELECTIVE-III)

SOFTWARE TESTING METHODOLOGIES

IV Year – I Semester **Course Code: 18IT7T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2) To Understand different levels of Testing
3) Apply Black Box and White Box Testing Techniques
4) To learn how to plan a test project, design test cases and data, conduct testing operations, and generate a test report.
5) To understand software test automation problems and solutions.

COURSE OUTCOMES:

1) Have an ability to apply software testing knowledge and engineering methods.
2) Ability to identify the needs of software test automation, and define a test tool to support test automation.
3) Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
4) Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
5) Apply techniques and skills to use modern software testing tools to support software testing projects.

SYLLABUS

UNIT-I

Software Testing: Introduction, Evolution, Dichotomies, Goals & Typical Objectives of Testing, Model for testing, Software Testing Principles Software Testing Terminology and Methodology: Software Testing Terminology, Errors, Defects, Failures, Root Causes and Effects, Software Testing Life Cycle, Software Testing Methodology.

UNIT II

Verification and Validation: Verification & Validation Activities, Categories of Test Techniques: Dynamic Testing, Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, White-Box Testing: Need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing

UNIT III

Experience Based Testing Techniques: Error Guessing, Exploratory Testing, Checklist- based Testing Static Testing: Inspections, Structured Walkthroughs, Technical reviews, Benefits of Static Testing, Static Vs Dynamic Testing.

Levels of Testing: Unit testing, Integration Testing,. Function testing, System testing and Acceptance testing. Regression testing: Progressive Vs Regressive testing, Objectives of regression testing, Regression testing techniques

UNIT IV

Test Management: Test Organization, Test Planning, Test Design and Test case specifications, Structure of a Testing Group, Reasons for the growth of a Test suite, Test suite Minimization, Test suite prioritization, Types of test case prioritization, prioritization techniques, Measuring the effectiveness of a prioritized test suite.

Debugging: Debugging process, Debugging Techniques, Correcting Bugs, Debuggers

UNIT V

Automation and Testing Tools: Need for automation, Testing Tool Considerations, Test Tool Classification, Benefits and Risks of Test automation, Special Considerations for Test execution and Test Management Tools, Principles for tool selection, Testing tools- success factors, Guidelines for automated testing, overview of some commercial testing tools.

TEXT BOOKS:

i. Software testing techniques - Baris Beizer, International Thomson computer press, second edition.(Unit 1)

ii. Software Testing, Principles and Practices, Naresh Chauhan, Oxford Publishers(Unit 2,3,4,5)

REFERENCES

1. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH

(PROGRAM ELECTIVE – III)

SOFTWARE PROJECT MANAGEMENT

IV Year – I Semester **Course Code: 18IT7T05**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT -IV

Project Monitoring: Control, Resource Allocation Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT -V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software
Quality, Quality plan of ACIC project

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson.(Units 1,2,3,4,5)
2. Software Project Management, Walker Royce: Pearson Education(Units 4, 5)

REFERENCES:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

(PROGRAM ELECTIVE-IV)
CRYPTOGRAPHY & NETWORK SECURITY

III Year – II Semester **Course Code: 18IT6T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Classical systems, symmetric block ciphers (DES, AES, other symmetric ciphers)
2) Public-key cryptography (RSA, discrete logarithms)
3) Algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes,
4) Email and web security.

COURSE OUTCOMES:

1) Understand the need of information security andits importance.
2) Apply symmetric security mechanisms for confidentiality
3) Apply asymmetric security mechanisms for confidentiality
4) Apply digital signature techniques for authentication
5) Understand network security designs using available secure solutions (such asPGP, SSL, IPSec)

SYLLABUS

UNIT-I

Introduction: Security Goals, Cryptographic Attacks, Services and Mechanisms, Techniques

Mathematics of Cryptography: Integer Arithmetic, Modular Arithmetic, Matrices , Linear Congruence,

Traditional Symmetric Key Ciphers: Introduction, Cipher Model, Substitution ciphers, Transportation cipher, Stream and Block Ciphers.

UNIT-II

Symmetric Key Encryption:

Mathematics of Cryptography- Algebraic Structures, GF Fields

Modern Symmetric Key Cryptography: Modern Block Ciphers, Modern Stream ciphers

Data Encryption Standard: DES Structure, DES Analysis, Multiple DES, Security of DES

Advanced Encryption Standard: Introduction, Transformations, Key Expansion, Analysis of AES.

UNIT-III

Asymmetric Key Cryptography:

Mathematics of Cryptography: Primes, Primality Testing, Factorization, Chinese Remainder Theorem.

Asymmetric Key Cryptography: Introduction, RSA Cryptosystems, Rabin Cryptosystems, ELGAMAL Cryptosystem, Elliptic Curve CryptoSystem.

UNIT- IV

Data Integrity, Digital Signature Schemes & Key Management:

Message Integrity and Message Authentication

Cryptographic Hash Functions:Introduction, SHA-512, Whirlpool

Digital Signature: Comparison, Process, Services, Attacks on Digital Signature, Digital Signature Shemes

Key Management: Symmetric Key Distribution, Kerberos, Symmetric key Agreement, Public Key Distribution.

UNIT -V

Security at application layer: PGP and S/MIME,

Security at the Transport Layer: SSL and TLS- SSL Architecture, Four Protocols, SSL Message Formats, Transport layer Security

Security at the Network Layer: IPSec- Two modes, Two Security Protocols, Security Association, security policy, Internet Key Exchange

TEXT BOOKS:

1) Cryptography and Network Security, Behrouz A Forouzan, Debdeep Mukhopadhyay, (3e) Mc Graw Hill. (Units 1, 2, 3, 4, 5)

REFERENCE BOOKS:

1) Cryptography and Network Security, William Stallings, (6e) Pearson.

2) Network Security and Cryptography, Bernard Meneges, Cengage Learning.

2) Everyday Cryptography, Keith M.Martin, Oxford.

(PROGRAM ELECTIVE –IV)
MOBILE COMPUTING

IV Year – I Semester **Course Code: 18IT7T07**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.

2) To understand the typical mobile networking infrastructure through a popular GSM protocol.

3) To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer.

4) To understand the database issues in mobile environments & data delivery models.

5) To understand the ad hoc networks and related concepts.

COURSE OUTCOMES:

1) Develop new mobile applications.

2) Identify solutions to the technical issues in the mobile communication paradigm.

3) Understand the ad hoc network applications and/or algorithms/protocols.

4) Understand & develop any existing or new protocol related to mobile environment.

5) Understand the platforms and protocols used in mobile environment

SYLLABUS

UNIT–I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT–II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT–III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT-V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.(Units 1,2,3)
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772(Units 4,5)

REFERENCES:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, “Mobile Computing, Technology Applications and Service Creation” Second Edition, McGraw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, “Principles of Mobile Computing,” Second Edition, Springer.

(PROGRAM ELECTIVE –IV)

MULTIMEDIA AND APPLICATION DEVELOPMENT

IV Year – I Semester **Course Code: 18IT7T08**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1. To learn and understand technical aspect of Multimedia Systems.
2. To understand the standards available for different audio.
3. To Design and develop various Multimedia Systems applicable in real time.
4. To learn various multimedia authoring systems.
5. To understand various networking aspects used for multimedia applications.
6. To develop multimedia application and analyze the performance.

COURSE OUTCOMES:

1. Developed understanding of technical aspect of Multimedia Systems.
2. Understand various file formats for audio, video and text media and video andtext applications.
3. Develop various Multimedia Systems applicable in real time.
4. Design interactive multimedia software.
5. Apply various networking protocols for multimedia applications.

SYLLABUS

UNIT-I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT-II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio. Action Script I : ActionScript Features, Object-Oriented ActionScript, Data types and Type Checking, Classes, Authoring an ActionScript Class.

UNIT-III

Action Script II: Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions. Application Development: An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

UNIT-IV

Multimedia data compression: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, and Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT-V

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques. Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand(MOD).

TEXT BOOKS:

1. Fudamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education. (1, 2, 3,

REFERENCE BOOKS:

1. Essentials ActionScript 2.0, Colin Moock, SPD O,REILLY.
2. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
3. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
4. Multimedia and communications Technology , Steve Heath, Elsevier(FocalPress).

BIG DATA &HADOOP LAB

IV Year – I Semester **Course Code: 18IT7L20**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

1. Optimize business decisions and create competitive advantage with Big Data analytics
2. Introducing Java concepts required for developing map reduce programs
3. Derive business benefit from unstructured data
4. Imparting the architectural concepts of Hadoop and introducing map reduce paradigm
5. To introduce programming tools PIG & HIVE in Hadoop echo system.

COURSE OUTCOMES:-

1. Preparing for data summarization, query, and analysis
2. Applying data modeling techniques to large data sets
3. Creating applications for Big Data analytics.
4. Building a complete business data analytic solution.

LIST OF EXPERIMENTS

Week 1,2:

1. Implement the following Data structures in Java

a)Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3, 4:

2. (i)Perform setting up and Installing Hadoop in its three operating modes: standalone, Pseudo distributed, Fully distributed

(ii)Use web based tools to monitor your Hadoop setup.

Week 5:

3. Implement the following file management tasks in Hadoop:

i) Adding files and directories

ii) Retrieving files

iii) Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 6:

1. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Week 7:

5. Write a Map Reduce program that mines weather data.

Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

Week 8:

6. Implement Matrix Multiplication with Hadoop Map Reduce

Week 9,10:

7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 11, 12:

8. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

MINI PROJECT/INTERNSHIP

IV Year - I Semester **Course Code: 18CS7L21**

Lecture: 0 Practical: 4 Internal Marks: 100

Credits: 2 Tutorial: 0 External Marks:

- The students are expected to take up an internship program with prior approval from the Department committee after III Year II Semester during the summer break which will be evaluated in the IV Year I Semester. The Internship program shall be for duration of 4 to 6 Weeks.
- The student shall submit a letter of Successful completion of the internship from the organization and present the work carried out to the evaluation committee.
- If the student was unable to take up in the internship program he/she has to take up a project work and will be evaluated in this semester by the Department Internal Evaluation Committee
- Continues Internal evaluation shall be done for 40 Marks and final evaluation shall be done for 60 Marks.

IV YEAR

SEMESTER-II

SYLLABUS

(PROGRAM ELECTIVE –V)

CLOUD COMPUTING

IV Year – II Semester **Course Code: 18IT8T01**

Lecture:3 Practical:0 **Internal Marks: 30**

Credits:3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Explain the technology and principles involved in building a cloud environment
2) Apply Map-Reduce concept to applications.
3) To implement Virtualization
4) Contrast various programming models used in cloud computing
5) Choose appropriate cloud model for a given application.

COURSE OUTCOMES:

1) Explain and characterize different cloud deployment models and service models
2) Understand different cloud programming platforms and tools\
3) Illustrate Virtualization for Data-Center Automation.
4) Identify the security issues in cloud computing
5) Understand various basic concepts related to cloud computing technologies

SYLLABUS

UNIT-I

Introduction and Evolution of Computing Paradigms: Overview of Existing Hosting Platforms, Cluster Computing, Grid Computing, Utility Computing, Autonomic Computing, Green Computing, Cloud Computing, history and evolution, practical applications of cloud computing for various industries, IoT, economics and benefits of cloud computing, spot markets, pricing models, Supercomputing-on-demand.

UNIT-II

Cloud Issues and Challenges: Cloud computing issues and challenges like Security, Elasticity, Resource management and Scheduling, QoS (Quality of Service) and Resource Allocation, Cost Management, Big Data, Pre-reservation and Cloud bursting.

Cloud Computing Architecture: Cloud Architecture model, Types of Clouds: Public Private & Hybrid Clouds, Cloud based services: Iaas, PaaS and SaaS.

UNIT-III

Data Center: Classic Data Center, Virtualized Data Center (Compute, Storage, Networking and Application), Business Continuity in VDC.

Virtualization: Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization: Resource Virtualization i.e. Server, Storage and Network virtualization, Migration of processes, VMware vCloud – IaaS

UNIT-IV

Cloud based Data Storage: Introduction No-SQL databases, Map-Reduce framework for Simplified data processing on Large clusters using Hadoop, Design of data applications based on Map Reduce in Apache Hadoop, Task Partitioning, Data partitioning, Data Synchronization, Distributed File system, Data Replication , Shared access to weakly consistent to data stores

UNIT-V

Classification of Cloud Implementations: Amazon Web Services, The Elastic Compute Cloud (EC2), The Simple Storage Service (S3), The Simple Queuing Services (SQS), Google AppEngine - PaaS, Windows Azure, Aneka, Hadoop, Microsoft Dynamics CRM, A Comparison of Cloud Computing Platforms.

TEXT BOOKS:

1. Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, Cloud Computing: Principles and paradigms, MIT Press (2011). (Units 1,2)
2. Cloud Computing: A practical Approach Anthony Velte, Toby Velte and Robert Elsenpeter by Tata McGrawHill (2009). (Unit 5)
3. Michael Miller, Cloud Computing, Que Publishing (2008).(Unit 3,4)

REFERENCES:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, F Halper, Cloud Computing for dummies (2009).
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier
4. Hwang, Kai, Jack Dongarra, and Geoffrey C. Fox. Distributed and cloud computing: from parallel processing to the internet of things. Morgan Kaufmann, 2013.

(PROGRAM ELECTIVE V)

MACHINE LEARNING & DEEP LEARNING

IV Year – II Semester **Course Code: 18IT8T02**

Lecture:3 Practical:0 **Internal Marks: 30**

Credits:3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To introduce students to the basic concepts and techniques of Machine Learning and deep learning.
2) To develop skills of using recent deep learning software for solving practical problems.
3) To gain experience of doing independent study and research.

COURSE OUTCOMES:

1) Understand the basic concepts of concept learning
2) Understand the concepts of evaluating the hypothesis
3) Understand the concept behind neural networks for learning non-linear functions.
4) Develop a deep neural network for image classification
5) Develop a deep network for sequence data analysis

SYLLABUS

UNIT-I

Introduction: Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning.

Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.

UNIT-II

Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.

Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting.

UNIT-III

Artificial Neural Networks: Introduction, Neural Network representation, Perceptrons, multi-layer perceptron, Feed forward neural network, Training Neural Network: Risk minimization, loss function, regularization, model selection, and optimization, Back propagation with case study.

UNIT-IV

Deep Learning: Deep Feed Forward network, regularizations, training deep models, dropouts, Convolution Neural Network.

UNIT-V

Recurrent Neural Network, Auto encoders Introduction to Deep Learning Tools: Tensor Flow, keras.

TEXT BOOKS:

1) Tom M. Mitchell, "Machine Learning" , India Edition 2013, McGraw Hill Education (Unit 1, 2, 3)
2) Huan Liu and Hiroshi Motoda, "Feature Selection For Knowledge Discovery And Datamining" ,Springer Science + Business Media, LLC 1998. (Unit 2)
3) Cha Zhanga and YunqianMa , "Ensemble Machine Learning Methods and Applications", Springer Science + Business Media, LLC 2012 (Unit 2)
4) Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016. (Unit 4)

REFERENCES:

1. Deep Learning with python by Francois Chollet, Manning Publications.
2. Hands-on Machine Learning with Scikit-learn and TensorFlow by AurelienGeron, O'Reilly Media,2017
3. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

(PROGRAM ELECTIVE –V)

PRINCIPLES OF TCP/IP

IV Year – II Semester **Course Code: 18IT8T03**

Lecture:3 Practical:0 **Internal Marks: 30**

Credits:3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Understand the IP addressing schemes.
2. Understand the fundamentals of network design and implementation
3. Understand the design and implementation of TCP/IP networks
4. Understand on network management issues
5. Learn to design and implement network applications.

COURSE OUTCOMES:

1. Design and implement TCP/IP networks.
2. Explain network management issues.
3. Design and implement network applications. Develop data structures for basicprotocol functions of TCP/IP.
4. Apply the members in the respective structures.

SYLLABUS

UNIT–I

Network Models: Layered Tasks, The OSI Model, Layers in OSI Model, TCP/IP Protocol suite, Addressing. Connecting devices: Passive Hubs, Repeaters, Active Hubs, Bridges, Two Layer Switches, Routers, Three Layer Switches, Gateway, and Backbone Networks.

UNIT–II

Internetworking Concepts: Principles of Internetworking, Connectionless Interconnection, Application Level Interconnection, Network Level Interconnection, Properties of the Internet, Internet Architecture, Interconnection through IP Routers TCP,

UDP; IP: TCP Services, TCP Features, Segment, A TCP Connection, Flow Control, Error Control, Congestion Control, Process to Process Communication, User Datagram, Checksum, UDP Operation, IP Datagram, Fragmentation, Options, IP Addressing: Classful Addressing, IPV6.

UNIT-III

Congestion and Quality of Service: Data Traffic, Congestion, Congestion Control, Congestion Control in TCP, Congestion Control in Frame Relay, Source Based Congestion Avoidance, DEC Bit Scheme, Quality of Service, Techniques to Improve QOS: Scheduling, Traffic Shaping, Admission Control, Resource Reservation, Integrated Services and Differentiated Services.

UNIT-IV

Stream Control Transmission Protocol: SCTP Services, SCTP Features, PacketFormat,Flow Control, Error Control, Congestion Control. Mobile Network Layer: Entities and Terminology, IP Packet Delivery, Agents, Addressing, Agent Discovery, Registration, Tunneling and Encapsulating, Inefficiency in Mobile IP.

UNIT-V

Mobile Transport Layer : Classical TCP Improvements, Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast/Recovery, Transmission, Timeout Freezing, Selective Retransmission, Transaction Oriented TCP.

TEXT BOOKS:

1. Behrouz A Forouzan, “TCP/IP Protocol Suite”, TMH, 3rd Edition(Units- 1,2,3,4,5)

REFERENCES:

1. Mahbub Hasan & Raj Jain, ” High performance TCP/IP Networking”, PHI -2005
2. Douglas. E.Comer, “Internetworking with TCP/IP “, Volume I PHI
3. Larry L. Perterson and Bruce S. Davie , “Computer Networks- A Systems Approach”, 2011, Morgan Kaufmann
4. Jochen Schiiler, “Mobile Communications”, Pearson, 2nd Edition.

(PROGRAM ELECTIVE –VI)

REAL TIME SYSTEMS

IV Year – II Semester **Course Code: 18IT8T04**

Lecture:3 Practical:0 **Internal Marks: 30**

Credits:3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

2) Technology capabilities and limitations of the hardware, software components
3) Methods to evaluate design tradeoffs between different technology choices.
4) Design Methodologies.

COURSE OUTCOMES:

1) Program an embedded system
2) Design, implement and test an embedded system.
3) Identify the unique characteristics of real-time systems
4) Explain the general structure of a real-time system
5) Define the unique design problems and challenges of real-time systems.

SYLLABUS

UNIT-I

Introduction to Embedded systems: What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples?

UNIT-II

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-IV

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, and Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

(PROGRAM ELECTIVE –VI)

HUMAN COMPUTER INTERACTION

IV Year – II Semester **Course Code: 18IT8T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. To make the student think constructively and analytically about how to design and evaluate interactive technologies.

COURSE OUTCOMES:

1) Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
2) Apply an interactive design process and universal design principles to designing HCI systems.
3) Understand the importance of Natural Languages in computing interactions.
4) Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
5) Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

SYLLABUS

UNIT-I

Introduction: Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession.

Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues.

UNIT-II

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

UNIT-III

Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

UNIT-IV

Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

UNIT-V

User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process.

TEXT BOOKS:

1. Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson (Units 1, 2, 3, 4)
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech. (Unit 5)

REFERENCE BOOKS:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.
2. Designing the user interface. 4/e, Ben Shneidermann , PEA.
3. User Interface Design, Soren Lauesen , PEA.
4. Interaction Design PRECE, ROGERS, SHARPS, Wiley.

(PROGRAM ELECTIVE –VI)

INTRODUCTION TO MAIN FRAME SYSTEMS

IV Year – II Semester **Course Code: 18IT8T06**

Lecture:3 Practical:0 **Internal Marks: 30**

Credits:3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

Students undergoing this course are expected

1. To understand the importance of Legacy System.
2. To role of Mainframes in infrastructure of a medium to large IT organization.
3. To understand the different components of Mainframe Technology.

COURSE OUTCOMES:

Students undergoing this course are able to:

1. Discuss Mainframes hardware systems. Operating systems and its functions.
2. Describe Z-operating system and Virtual Storage.
3. Explain the need of Job Control Language Statement and Procedures on JoB Processing
4. Develop applications using COBOL Programming
5. Expand Mainframe applications using COBOL-DB2 programming.

SYLLABUS

UNIT-I

Hardware configurations, Processors, Multiprocessing, Input/ Output Devices, Applications, Characteristic Features of Mainframe Operating System, Mainframe Configurations, Roles in the Mainframe World, Typical Mainframe Workloads. Operating systems on mainframes, Batch processing vs. online processing - mainframe operating system concepts

UNIT-II

z/Os and other Mainframe operating systems, What is z/OS, Overview of z/OS facilities, virtual Storage and other Mainframe Concepts, Workload management, MVS Concepts ,Address Spaces ,Addressing Mode and Residence Mode , Multiple Virtual Storage, Multiprogramming, MVS/370
Address Space Organizations, How data sets are stored?, Catalogs, Data Set Organization, VSAM Basics Introduction to Job Control language - Job processing - structure of JCL statements - Various statements in JCL - JOB statement - EXEC statement - DD statement - JCL procedures and IBM utility programs

UNIT-III

Introduction – History, evolution and Features, COBOL program Structure, steps in executing COBOL. Language Fundamentals – Divisions, sections, paragraphs, sections, sentences and statements, character set, literals, words, figurative constants, rules for forming user defined words, COBOL coding sheet. Data division – Data names, level numbers, PIC and VALUE clause, REDEIFNES, RENAMES and USAGE clause. Procedure Division – Input / Output verbs, INITIALIZE verb, data movement verbs, arithmetic verbs, sequence control verbs

UNIT-IV

File processing – Field, physical / logical records, file, file organization (sequential, indexed and relative) and access mode, FILE-CONTROL paragraph, FILE SECTION, file operations. File handling verbs – OPEN, READ, WRITE, REWRITE, CLOSE. Table processing – Definition, declaration, accessing elements, subscript and index, SET statement, SEARCH verb, SEARCH ALL verb, comparison.

UNIT-V

Overview of DB2 and Mainframe Application Development GuidelinesIntroduction to DB2,Major components of DB2- System Service component, LockingService component, Database Service component, DB2 Application program preparation and Execution,DB2 Objects-Databases, Tablespaces, Stored tables, Indexes, Indexspaces, Storage groups, View, Bufferpool. DB2 SQL programming – Types of SQL statements, DCL, DDL, DML, Advanced SQL topics, UPDATE operations, Aggregate functions

TEXT BOOKS:

1. IBM Mainframe Handbook – Alexis Leon. (For Unit 1, 3,4,5) 2. M.K. Roy and D.Ghosh Dastidar,
2. “Cobol Programming”, Tata McGraw Hill, Second Edition. (Unit 3)

3.Doug Lowe, “MVS JCL “, Mike Murach and Associates Inc, 2nd edition, 1994.(Unit 2)

REFERENCE BOOKS:

1. COBOL - Language Reference, Ver 3, Release 2, IBM Redbook.

2. COBOL - Programming Guide, Ver 3, Release 2, IBM Redbook

.3. Gary DeWard Brown, JCL Programming Bible (with z/OS) fifth edition, Wiley IndiaDream Tech, 2002.

4. M.K. Roy and D. Ghosh Dastidar, “Cobol Programming”, Tata McGraw Hill, NewYork, 1973.

5. Newcomer and Lawrence, Programming with Structured COBOL, McGraw Hill Books, NewYork, 1973.

MAJOR PROJECT

IV Year - II Semester **Course Code: 18IT8L22**

Lecture: 0 Practical: 14 Internal Marks: 40

Credits: 7 Tutorial: 0 External Marks: 60

- **The Student takes up a project work along with the four subjects mentioned. The project shall have two evaluations**
  - Internal Evaluation – Continues evaluation will be done for 40 Marks
  - External Evaluation – Will be performed by an External Examiner 60 Marks

Employability Skills: Competitive Coding

Open Elective I

Lecture: 2 Practical: 2 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

COURSE OBJECTIVES:

2) To give an understanding of programming concepts.
3) To get the student prepared for various coding contests conducted as part of their recruitment process

COURSE OUTCOMES:

1) Understand and Apply the fundamental concepts of various programming Languages.
2) Apply Recursion to various problems.
3) Assess the Efficiency of Algorithms.
4) Apply Search and Sort Techniques.
5) Apply Data Structures for Problem Solving.

SYLLABUS

Unit I:
What is Competitive Programming, Various Programming Contests?
Programming Techniques: Programming Language Features, Input & Output, Working with Numbers, Control Structures, Understanding and displaying various patterns, shortening the code: Examples

Unit II:
Recursive Algorithms: Generating Subsets, Generating Permutations, Backtracking, Bit Manipulations, Representing Sets. Examples

Unit III:
Algorithm Efficiency: Time complexity, Rules for calculating Time complexity, calculating Time complexity, Estimating Efficiency of Algorithms: Examples

Unit IV:
Sorting and Searching: Implementing the sorting Algorithms, Solving problems by sorting- Scheduling events, Tasks and Deadlines, Implementing Binary Search, Finding the optimal solutions: Examples

Unit V:
Data Structures: Applying Linear and Non Linear Data Structures: Stacks, Queues, Linked Lists, Priority Queues, Hash Tables, Trees, Graphs - Examples

Programming Languages to Discuss: C , C++, Java

Students must solve at least 100 problems in CodeChef / HackerRank, etc. The category may be under Easy / Medium. Problems to be solved in C,/C++/ Java or Python.

A minimum of 10 problems shall be solved per week in either CodeChef / HarckerRank, etc. The contests hosted in CodeChef / HackerRank, etc,. may be taken as day to day assessment of laboratory which will be evaluated for 30 Marks The work will be carried out in the laboratory slot allotted as well as at the home. Final Evaluation shall be done internally for 70 Marks.

TEXTBOOKS & REFERENCES

1) Halim, Steven and Halim, Felix, Competitive Programming 3, 2013.
2) Ahmed Shamsul Arefin, Art of Programming Contest, ACMSolver, Second Edition, 2012
3) Programming Challenges: The Programming Contest Training Manual By Steven S Skiena, Miguel A. Revilla
4) Guide to Competitive Programming: Learning and Improving Algorithms Through Contests By Antti Laaksonen
5) Cracking the Coding Interview 6th Edition. GAYLE LAAKMANN MCDOWELL
6) C++ Complete Reference- 4th Edition- Herbert Schildt- TMH
7) Introduction to Programming Languages - Arvind Kumar Bansal.

COMPUTER NETWORKS

Open Elective II

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.

3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

4) Learn various IEEE standards for medium access.

5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP

2) Identify the different types of network topologies and protocols.

3) Compare and contrast methods to identify Errors and correct them.

4) Differentiate between various network routing algorithms.

5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOFTWARE PROJECT MANAGEMENT

Open Elective

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure.

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases

Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis.

Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT-IV

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT-V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality, Quality plan of ACIC project

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson. (Units 1, 2, 3, 4, 5)
2. Software Project Management, Walker Royce: Pearson Education (Units 4, 5)

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

COMPUTER ORGANIZATION & ARCHITECTURE

Open Elective III

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

PREREQUISITES: -DLD

COURSE OUTCOMES:

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

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shiftmicro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input –Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

INTERNET OF THINGS

Open Elective IV

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram " Internet of Things" Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley andSons2014.

OPERATING SYSTEMS

Open Elective V

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

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

1.Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.

2. Apply synchronization to cooperating processes and handle the deadlocks

3. Learn various management techniques for efficient utilization of system memory.

4. Understand and analyze theory andimplementation offiles and Evaluate different disk scheduling algorithms.

5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

MECHANICAL ENGINEERING
COURSE STRUCTURE
B. Tech I SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME1T01	HSMC	English-1	2	-	-	2	2
2	18ME1T02	BSC	Linear Algebra & Differential Equations	3	1	-	4	4
3	18ME1T03	BSC	Engineering Chemistry	3	-	-	3	3
4	18ME1T04	ESC	Problem solving through C	3	-	-	3	3
5	18ME1T05	ESC	Engineering Mechanics	3	1	-	4	4
6	18ME1L06	HSMC	English Communication Skill Lab-1	-	-	2	2	1
7	18ME1L07	BSC	Engineering Chemistry Lab	-	-	3	3	1.5
8	18ME1L08	ESC	Problem solving through C Lab	-	-	3	3	1.5
9	18ME1T09	MC	Environmental Studies	2	-	-	2	-
							Total number of credits	**20**

B. Tech II SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME2T01	HSMC	English-II	1	0	**2**	3	2
2	18ME2T02	BSC	Vector Calculus and Fourier Transforms	3	0	-	3	3
3	18ME2T03	BSC	Engineering Physics	3	0	-	3	3
4	18ME2T04	BSC	Biology for Engineers	2	-	-	2	2
5	18ME2T05	ESC	Basic Electrical & Electronics Engineering	3	-	-	3	3
6	18ME2T06	ESC	Engineering Graphics	3	-	-	3	3
7	18ME2L07	BSC	Engineering Physics Lab	-	-	3	3	1.5
8	18ME2L08	ESC	Basic Electrical & Electronics Engineering Lab	-	-	2	2	1
9	18ME2L09	ESC	Basic Engineering & IT Workshop	-	-	3	3	1.5
							Total number of credits	**20**

B. Tech III SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME3T01	PCC	Complex variables & Numerical methods	2	1	0	3	3
2	18ME3T02	BSC	Mechanics of Solids	2	1	0	3	3
3	18ME3T03	PCC	Kinematics of Machines	2	1	0	3	3
4	18ME3T04	PCC	Thermodynamics	2	1	0	3	3
5	18ME3T05	ESC	Materials science and Engineering	3	0	0	3	3
6	18ME3T06	PCC	Fluid mechanics & hydraulic machines	3	0	0	3	3
7	18ME3L07	PCC	Fluid mechanics & Hydraulic machines lab	0	0	3	1.5	1.5
8	18ME3L08	PCC	Mechanics of Solids & Metallurgy LAB	0	0	3	1.5	1.5
9	18ME3L09	HSMC	Proficiency through Reading and Writing	0	0	2	2	1
				Total number of credits				22

B. Tech IV SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME4T01	BSC	Probability & Statistics	2	1	0	3	3
2	18ME4T02	ESC	Production Technology	3	0	0	3	3
3	18ME4T03	PCC	Design of Machine Elements	2	1	0	3	3
4	18ME4T04	ESC	IC Engines & Air Compressors	2	1	0	3	3
5	18ME4T05	PCC	Computer Aided Machine Drawing	1	0	4	3	3
6		OEC	**Open Elective-1**	3	0	0	3	3
7	18ME4L09	ESC	Production Technology Lab	0	0	3	3	1.5
8	18ME4L10	PCC	Thermal engineering Lab	0	0	3	3	1.5
9	18ME4T11	MC	Indian constitution	2	0	0	2	0
10	18ME4I12	P	Summer Internship	0	0	0	0	1
				Total number of credits				22

B. Tech V SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME5T01	PCC	Dynamics of Machines	2	1	0	3	3
2	18ME5T02	HSMC	Management Science & Productivity	3	0	0	3	3
3	18ME5T03	PCC	Turbo machines	3	0	0	3	3
4	18ME5T04	PCC	MC&MT	3	0	0	3	3
5		OEC	**Open Elective-2**	3	0	0	3	3
6	18ME5L13	PCC	Theory of machines Lab	0	0	3	1.5	1.5
7	18ME5L14	PCC	MT Lab	0	0	3	1.5	1.5
8	18ME5L15	HSMC	Communication Skills Lab	0	0	2	2	1
9	18ME5T16	MC	Essence of Indian Traditional Culture	2	0	0	0	0
				Total number of credits				19

B. Tech VI SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME6T01	PCC	Design of Transmission Elements	2	1	0	3	3
2	18ME6T02	PCC	Heat Transfer	2	1	0	3	3
3	18ME6T03	PCC	Metrology and measurements	3	0	3	3	3
4		PEC	**Professional Elective -1**	3	0	0	3	3
	18ME6T04		Experimental Stress Analysis					
	18ME6T05		Design for Manufacturing					
	18ME6T06		R & AC					
5		OEC	**Open Elective-3**	3	0	0	3	3
6	18ME6L21	PCC	Metrology & Instrumentation Lab	0	0	3	3	1.5
7	18ME6L22	PCC	Heat Transfer Lab	0	0	3	3	1.5
8	18ME6T23	MC	Disaster Management	2	0	0	2	0
9	18ME6I24	P	Summer Internship	-	-	-	-	1
				Total number of credits				19

B. Tech VII SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18ME7T01	PCC	CAD CAM	3	0	0	3	3
2	18ME7T02	HSMC	Operational Research	3	0	0	3	3
3		PEC	**Professional Elective -2**	3	0	0	3	3
	18ME7T03		Finite Element Methods					
	18ME7T04		Gas Dynamics & Jet Propulsion					
	18ME7T05		Production Planning & Control					
4		PEC	**Professional Elective -3**	3	0	0	3	3
	18ME7T06		Advanced Materials					
	18ME7T07		Power plant Engineering					
	18ME7T08		Optimization Techniques through MATLAB					
5		PEC	**Professional Elective -4**	3	0	0	3	3
	18ME7T09		Condition Monitoring and Signal Conditioning					
	18ME7T10		Computational Fluid Dynamics					
	18ME7T11		Advanced Machining Processes					
6	18ME7L12	PCC	CAD CAM Lab	-	-	4	2	2
7	18ME7P13	P	Mini project	-	-	4	2	2
			Total number of credits					19

B. Tech VIII SEMESTER

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1		PEC	**Professional Elective -5**	3	0	0	3	3
	18ME8T01		Mechanical Vibrations					
	18ME8T02		Automobile Engineering					
	18ME8T03		Non Destructive Evaluation					
2		OEC	**Open Elective-4**	3	0	0	3	3
3		OEC	**Open Elective-5**	3	0	0	3	3
4	18ME8S19	P	MOOCS	-	-	4	4	2
5	18ME8P20	P	Project	-	-	16	16	8
			Total number of credits					19

OPEN ELECTIVES

Open elective-1 (IV Semester)

S.No.	Course Code	Course Category	Course Title	Offering Dept.
1.	18ME4T06	OEC	Engineering Economics & Financial Analysis	DMS
2.	18ME4T07	OEC	Management Information System	CSE
3.	18ME4T08	OEC	Entrepreneurship & Project Management	DMS

Open elective-2 (V Semester)

S.No.	Course Code	Course Category	Course Title	Offering Dept.
1.	18ME5T05	OEC	Employability Skills: Quantitative Aptitude & Reasoning	BED
2.	18ME5T06	OEC	Optimization Techniques	BED
3.	18ME5T07	OEC	Electrical Engineering Materials	EEE
4.	18ME5T08	OEC	Basics of Control Systems	EEE
5.	18ME5T09	OEC	Design Thinking & Product Innovation	ME
6.	18ME5T10	OEC	Solid State Devices and Circuits	ECE
7.	18ME5T11	OEC	Principles of Communication	ECE
8.	18ME5T12	OEC	Employability Skills: Competitive Coding	CSE/IT

Open elective-3 (VI Semester)

S.No.	Course Code	Course Category	Course Title	Offering Dept.
1.	18ME6T07	OEC	Employability Skills: Quantitative Aptitude & Reasoning	BED
2.	18ME6T08	OEC	Basic Civil Engineering	CE
3.	18ME6T09	OEC	Sustainable Engineering Practices	CE
4.	18ME6T10	OEC	Disaster Management	CE
5.	18ME6T11	OEC	Low Cost Housing	CE
6.	18ME6T12	OEC	Design and Estimation of Electrical Systems	EEE
7.	18ME6T13	OEC	Energy Audit, Conservation and Management	EEE
8.	18ME6T14	OEC	Nanotechnology	ME
9.	18ME6T15	OEC	Microprocessors and microcontroller	ECE
10.	18ME6T16	OEC	Embedded Systems	ECE
11.	18ME6T17	OEC	Employability Skills: Competitive Coding	CSE/IT
12.	18ME6T18	OEC	Computer Networks	CSE/IT
13.	18ME6T19	OEC	Managerial Economics and Financial Analysis	DMS
14.	18ME6T20	OEC	Cross Cultural management	DMS

Open elective-4 (VIII Semester)

S.No.	Course Code	Course Category	Course Title	Offering Dept.
1.	18ME8T04	OCE	Robotics	ME
2.	18ME8T05	OCE	Additive manufacturing	ME
3.	18ME8T06	OCE	Green Engineering Systems	ME
4.	18ME8T07	OCE	Polymer Chemistry	BED
5.	18ME8T08	OCE	Advanced Civil Engineering Technologies	CE
6.	18ME8T09	OCE	Advanced Drawing for Civil Engineers	CE
7.	18ME8T10	OCE	Utilization of Electrical Energy	EEE
8.	18ME8T11	OCE	Power Quality	EEE

Open elective-5 (VIII Semester)

S.No.	Course Code	Course Category	Course Title	Offering Dept.
1.	18ME8T12	OCE	Mechatronics	ME
2.	18ME8T13	OCE	Micro-Electro- Mechanical Systems	ME
3.	18ME8T14	OCE	Solar Energy Systems	ME
4.	18ME8T15	OCE	Soft Computing Techniques	ECE
5.	18ME8T16	OCE	Satellite communication	ECE
6.	18ME8T17	OCE	Internet of Things	CSE
7.	18ME8T18	OCE	Operating Systems	CSE

Note: Prior approval from the department is required for the selection of open electives

I

SEMESTER

SYLLABUS

I Semester	L	T	P	C
	2	0	0	2

ENGLISH-1 (18ME1T01)

Syllabus:

Unit 1 Human Resources
Ideal Family

Unit 2 In London
Verger

Unit 3 Our Living
Environment Three
Days to See

Unit 4 Part A: Energy: Alternative
Sources War

Unit 5 Principles of Good
Writing Letter Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

I Semester	L	T	P	C
	3	1	0	4

LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS (18ME1T02)

UNIT I: Linear systems of equations, Eigen values & Eigen vectors

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations. Gauss -Jordan method, LU decomposition method, **Application:** Finding the current in electrical circuits, Eigen values, Eigen vectors, Properties of Eigen values (without proofs).

UNIT II: Quadratic forms & Differential calculus:

Cayley-Hamilton theorem (without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor's and Maclaurin's series. Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor's theorem for functions of two variables. **Applications:** Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT III: Differential equations of first order:

Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli's equation, Exact differential equations. Equations reducible to exact equations, **Applications:** Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth.

UNIT IV: Differential equations higher order:

Part –A : Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x). Rules to find the particular integral (RHS term of the type e^{ax} V(x), any other function), Method of variation of parameters. **Application:** L-C-R circuits.

UNIT V: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t. Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rd Edition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

I Semester	L	T	P	C
	3	0	0	3

ENGINEERING CHEMISTRY (18ME1T03)

UNIT I: POLYMERS AND PLASTICS

Introduction- Degree of polymerization-functionality- tactility -stereospecific polymers Types- Addition polymerization-Definition-PVC-Properties-applications

Condensation polymerization-Bakelite-Properties-applications-differences between addition and condensation polymerization-Physical and mechanical properties of polymers-Thermoplastics and Thermosetting plastics. Conducting polymers– Biodegradable polymers-applications– Natural rubber-Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol- Composite materials & Fiber reinforced plastics

UNIT II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

PART-A Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes)Primary cells: Zinc – air cell Secondary cells:- Lithium ion batteries, Pb-acid cell,

Fuel cells:- H_2-O_2 fuel cell and molten carbonate fuel cells

Corrosion:- Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating -Electroless plating

UNIT III : WATER TECHNOLOGY

Hard water:- Reasons for hardness – units of hardness

Boiler troubles – Priming and Foaming, Sludge and Scale formation, Boiler corrosion, Caustic embrittlement. Softening of water : Zeolite process- Ion Exchange process

Effluent treatment (biological, aerobic and anaerobic methods)

Water for drinking purposes- Purification – Sterilization and disinfection: Chlorination, Break point chlorination. Desalination of brackish water– Reverse Osmosis and Electro Dialysis

UNIT IV: FUELS

Fuels:- Introduction – Classification – Characteristics of a good fuel-Calorific value - HCV and LCV – Dulong's formula – Bomb calorimeter – Numerical problems

Solid fuels —Coal — Proximate and ultimate analysis –Significance of the analyses

Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents –Power alcohol – Bio-diesel

Gaseous fuels – Natural gas – LPG and CNG

UNIT V: CHEMISTRY OF MATERIALS AND ANALYTICAL TECHNIQUES

Lubricants: - Definition, function, Theory and mechanism of lubricants, properties (Definition and

importance)-viscosity, flash and fire point, aniline point, cloud and pour point

Nano materials:-Introduction –General methods of preparation (top down and bottom up) - Applications

Green synthesis:- Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources(microwave method) -R4M4 principles-Econoburette.

UV Spectroscopy- Basic principle-Instrumentation- Applications

IR Spectroscopy- Basic principle-Instrumentation- Applications

NMR Spectroscopy- Basic principle-Instrumentation-

Applications Analytical techniques: FE-SEM,TEM,BET

Chromatography techniques: Paper chromatography, Thin layer chromatography- applications

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM

I Semester	L	T	P	C
	3	0	0	3

PROBLEM SOLVING THROUGH C (18ME1T04)

UNIT I

INTRODUCTION TO COMPUTERS

Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process.

BASICS OF C PROGRAMMING:

Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT II

Decision making statements: if, if else, nester if. Muti way decision making statements: else if, Switch statement

Looping statements: while, do while, for, Compilation process

UNIT III

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, Two dimensional arrays, Matrix Operations, Multi dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT IV

FUNCTIONS

Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion , Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS

Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation.

UNIT V

STRUCTURES AND UNIONS

Structure , Nested structures , Pointer and Structures , Array of structures , Example Program using structures and pointers , Self referential structures, Unions.

FILE PROCESSING

Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command line arguments

Text Books:

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Krnighan. B.W and Ritche, D.M, "The C Programming Language", Second Edition, Pearson Education, 2006
3. Pradep dey, Manas Ghosh, "Fundamentals of Computing and programming in C", First Edition, Oxford University Press, 2009.

References:

1. Paul Deitel and Harvey Deitel, "C How to Program", Seventh Edition, Pearson Publication.
2. E Balagursamy, "Programming in C, Sixth Edition, Tata McGraw Hill.
3. Ajay Mittal, "Programming in C A practical Approach", Pearson education

I Semester	L	T	P	C
	3	1	0	4

ENGINEERING MECHANICS (18ME1T05)

UNIT – I: Introduction to Engg. Mechanics – Basic Concepts.

Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – II

Friction: Introduction**,** limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction, Wedges.

Analysis of plane trusses-Method of Joints, Method of Sections.

UNIT – III

Centroid: Centroid of simple figures (from basic principles) – Centroid of Composite Figures.

Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappu's theorems.

UNIT IV

Area moment of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation– Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

TEXT BOOKS :

1. Engineering Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.
2. Engineering Mechanics- S S Bhavikati –New Age International Publishers

REFERENCES :

1. Engineering Mechanics, statics and dynamics – I.H.Shames, – Pearson Publ.
2. Engineering Mechanics, Fedinand . L. Singer, Harper – Collins.
3. Engineering Mechanics statics and dynamics , A Nelson , Mc Graw Hill publications
4. Engineering Mechanics- A K Tayal
5. Engieering Mechanics , R.K.Bansal, Laxmi Publications
6. Engg. Mechanics- KL Kumar-Tata McGraw Hill publications

I Semester	L	T	P	C
	0	0	2	1

ENGLISH COMMUNICATION SKILLS LAB-1
(18ME1L06)

List of Experiments:

1 Greetings and Introduction
2 Request Permission & Giving Directions
3 Inviting/Complaining/Congratulating
4 Root Words
5 Phonetics-Sounds and Symbols
6 Pronunciation Rules

References:

1. *Strengthen Your Steps*, Maruti Publications
2. *Interact*, Orient Blackswan
3. *Word Power Made Easy*, Pocket Books

I Semester	L	T	P	C
	0	0	3	1.5

ENGINEERING CHEMISTRY LABORATORY (18ME1L07)

S.No	Name of the Experiment
1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
4	Determination of temporary and permanent hardness of water using standard EDTA solution.
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

I Semester	L	T	P	C
	0	0	3	1.5

PROBLEM SOLVING THROUGH C LAB (18ME1L08)

1. Write a C program to convert temperature from Fahrenheit to Celsius.
   Write a C program to find the roots of a quadratic equation.
   Write a program to implement simple calculator using switch case
2. Write a C program to determine if the given number is a prime number or not.
   Write a program to display the factorial of a given number
3. Write a program to display whether a given is Armstrong or not
   Write a C program to generate the first n terms of the Fibonacci sequence.
4. Write a C program to display the reverse of a given number.
   Write a C program to calculate the following sin and cos value
5. Write a program for sorting numbers in a list.
6. Write programs for searching a number in the list using
   a.Linear search
   b.Binary search
7. Write programs that reads two matrices to perform the following:
   a.Addition of two matrices
   b.Multiplication of two matrices
8. Write a program to perform the following operations without using build in string operations:
   a.To display the length of the string.
   b.To check whether the string is palindrome or not
   c.To delete n characters from a given position in a given string.
9. Write a program to generate GCD of two numbers using functions
10. Write a C program that reads two integers n and r to compute the ncr value using the following relation: ncr(n, r) = n! / r! (n,r)! . Use a function for computing the factorial value of an integer.
11. Write programs for the following using recursive functions
    a.Factorial of a given number
    b.GCD of two numbers
    c. Fibonacci series
12. Write a program to demonstrate call by value and call by reference.
13. Write a program to perform following operating using pointers
    a.Reverse of a string
    b.Comparison of two strings
14. Write a program for displaying the details of the student by sorting them according to the marks using structure containing roll no, name and marks.

15. Write a program for merging two files
16. Write a program to count no of lines, words, characters in a file
17. C Program to Create Employee File Name Record that is taken from the Command Line Argument

I Semester	L	T	P	C
	2	0	0	0

ENVIRONMENTAL STUDIES (18ME1T09)

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of Environmental Studies- Importance of Environmental Studies- Need for public awareness, Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference, Earth summit.

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem, Desert ecosystem- Aquatic ecosystem: pond, Lake Ecosystem- Streams, river ecosystem, Oceans.

UNIT-II: NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources- Forest resources**:** Use and over-exploitation - Deforestation-Timber extraction-Mining- Conservation- Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management- Energy resources**:** renewable energy sources –solar- wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: BIODIVERSITY AND ITS CONSERVATION

Definition, classification- Value of biodiversity- Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India- Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV: ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects,control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTAL LEGISLATION &MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of Envirronmental Management Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4.Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

II

SEMESTER

SYLLABUS

II Semester	**L**	**T**	**P**	**C**
	1	**0**	**2**	**2**

ENGLISH-II (18ME2T01)

Unit 1: Transport: Problems and Solutions The Scarecrow

Unit 2: The Drunkard

A Village Lost to the Nation **Unit 3:** Evaluating Technology

The Knowledge Society

Unit 4: Industry: Safety and Training

Martin Luther King and Africa

Unit 5: Man's Peril (Detailed)

Report Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

ENGLISH COMMUNICATION SKILLS LAB II

1	a.	Introducing Yourself and Other People
		Employability Skills
	b.	Introduction to Soft Skills
		My Skills, My Strengths
2	a.	Discussing Daily Routines
		Free Time Activities
	b.	Describing Family
		Talking about Family
3	a.	Giving Directions
		Ordering Food
	b.	Asking for and Paying the Bill
		Describing Appearances and Personality
4	a.	Writing a Product Description-1
	b.	Writing a Product Description-2
5	a.	Describing an Advertised Job
		Skills Needed for Different Jobs
	b.	What Kind of Job Are You Interested in?
		Finding out about a Job
6.	a.	Managing Nerves in a Presentation
	b.	Learning about Presentations

Reference:

Online Resources:

https://goo.gl/v57WHe

http://www.careerbuilder.co.in

https://goo.gl/w3FweC

https://goo.gl/4GoueJ

II Semester

L	T	P	C
3	0	0	3

VECTOR CALCULUS AND FOURIER TRANSFORMS (18ME2T02)

UNIT I: SPECIAL FUNCTIONS & MULTIPLE INTEGRALS:

Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Multiple Integrals: Double integrals in Cartesian & polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems).

Applications: Area enclosed by plane curves, Volume of solids.

UNIT II: VECTOR CALCULUS:

Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div& Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Vector Integration: Line integral, Green's theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

UNIT III: FOURIER SERIES:

Euler's formulae (without proof), Conditions of a Fourier expansion, Functions having points of discontinuity. Change of interval, Even and odd functions, Half-range series.

UNIT IV: FOURIER TRANSFORMS:

Fourier Integral, Fourier cosine & sine integral, complex forms of Fourier integral. Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite Fourier sine & cosine transforms.

UNIT V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Definition of PDE, Classification of 2^{nd} order PDE, Variable separable method, Vibrations of a stretched string – Wave equation. One-dimensional heat flow, Two-dimensional heat flow, Solution of Laplace's equation.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rdEdition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
2. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

II Semester	L	T	P	C
	3	0	0	3

ENGINEERING PHYSICS (18ME2T03)

UNIT –I

CRYSTAL STRUCTURE

Lattice, Basis and Unit cell – Lattice parameters – Bravais Lattices – Crystal Systems – Coordination number –SC, BCC, FCC – Packing Fraction. Miller Indices – Crystal Planes – Inter planar distance – X- ray Diffraction – Bragg's Law- Imperfections in Crystals – Point defects

UNIT –II

WAVES & OSCILLATIONS

Characteristics of sound waves – Simple harmonic motion-Displacement-Amplitude-Time period – Frequency-Phase-Wavelength-Equation for SHM. Free Vibrations-Damped vibrations- Forced vibrations –Resonance.

UNIT– III

ACOUSTICS

Reverberation time -Sound Absorption, Absorption Coefficients and its measurement – Sabine's Formula – Basic Requirements of Acoustically good hall – Factors affecting architectural Acoustics and their remedies.

ULTRASONICS

Production – Ultrasonic transducers – Non Destructive Testing(NDT) – Pulse Echo Technique - Different types of Scans – Applications.

UNIT–IV

INTRODUCTION TO ELECTROMAGNETIC THEORY

Grad – Div – Curl – Gauss and Stoke's theorems – Fundamental Laws of Electromagnetism.

Maxwell's Equations – Poynting vector- Propagation of Electromagnetic waves in a dielectric medium.

UNIT – V

LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Applications.

OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Engineering Applications(Buildings , Bridges, Pavements and Sensors).

Text Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications

2. Engineering Physics by M.Avadhanuluand P.G. Kshirasagar – S Chand Publications (10th Edition)

3. Applied Physics by S.O.Pillai – New Age Publications – (3rd Edition)
4. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd.

Reference Books:

1. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014 Edition)
2. Engineering Physics by M.Armugam – Anuradha Publications
3. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications.
4. Engineering Physics by V.Rajendran (2010 Edition) Mc Graw Hill Publications.

II Semester	L	T	P	C
	2	0	0	2

BIOLOGY FOR ENGINEERS (18ME2T04)

UNIT-1: INTRODUCTION

Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry. Classification of organisms based on (a) Cellularity- Unicellular or Multicellular , (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

UNIT-2: BIOMOLECULES

Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function. Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

UNIT-3: ENZYMES & METABOLISM

Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters. Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

UNIT-4: INFORMATION TRANSFER

Concept of genetic code. Molecular basis of information transfer; Transcription and translation.

UNIT-5: MICROBIOLOGY

Concept of species and strains, Identification of Microorganisms. Sterilization and media compositions, Growth kinetics.

TEXT/REFERENCE BOOKS:

1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd.
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

II Semester	L	T	P	C
	3	0	0	3

BASIC ELECTRICAL & ELECTRONICS ENGINEERING (18ME2T05)

UNIT – I: ELECTRIC CIRCUITS

Basic definitions, Types of network elements & sources, Ohms law, Kirchhoff's laws, Series & parallel circuits. Source transformation, Network reduction reductions, Introduction to AC circuits.

UNIT – II: ELECTRICAL MACHINES

Basic laws – Faraday's laws of electromagnetic induction, Lenz's law, Right hand thumb rule, Fleming's left hand and right hand rules, Construction, working principle and applications of DC machines**.** Construction, working principle and applications of transformers, induction motor and synchronous machines.

UNIT – III: ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION

Sources of Energy – conventional & non conventional, Introduction and layout of thermal, hydel power plants**.** Introduction and layout of nuclear power plants, solar power plants, Concepts of power transmission and distribution using single line diagram.

UNIT – IV: ELECTRICAL INSTALLATIONS & SAFETY

Components of Switchgear – fuse, MCBs, types of wires & cables, earthing, different types of batteries, Elementary calculations for energy consumption and types of tariffs. Energy Conservation. Electric shock and first aid, Hazardous areas, General principles of electric safety.

UNIT – V: BASIC ELECTRONIC DEVICES AND THEIR APPLICATIONS

Introduction to semi-conductor physics, PN junction diode, Zener diode, Transistor - operation, characteristics and configurations, Operation of transistor as a switch. Half wave, full wave and bridge rectifier using diodes, types of filters, Zener diode as a voltage regulator, transistor as an amplifier. introduction to feedback amplifiers.

TEXT BOOKS:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGraw Hill, Second Edition

II Semester	L	T	P	C
	3	0	0	3

ENGINEERING GRAPHICS (18ME2T06)

UNIT I:

Lettering, Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods. Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes-Tangent and Normals to the above curves.

UNIT II :

Orthographic projections: Introduction, Projections of points. Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane. Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane, Projections of planes inclined to both the reference planes.

UNIT IV:

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

UNIT V:

Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views. Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text Books:

1. Engineering Drawing, N. D. Butt, Chariot Publications
2. Engineering Drawing +Auto CAD, K Venugopal &V Prabhuraja, Newage Publishers.

Reference Books:

1. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree, K. C. John, PHI Publishers
3. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers
4. Engineering Graphics, P.I. Varghese, McGraw Hill Publishers

II Semester	L	T	P	C
	0	0	3	1.5

ENGINEERING PHYSICS LAB (18ME2L07)

(Any 10 of the following listed experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings - Sonometer
9. Determination of Young's modulus by method of single cantilever oscillations.
10. Melde's experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p - n junction.

II Semester	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB (18ME2L08)

LIST OF EXPERIMENTS

1. Study of different switches, MCBs, measuring instruments, wires and cables.
2. Identification and measurement of resistance, inductance & capacitance.
3. Practice house wiring with MCB, 3 pin socket, 2 way control of lamp.
4. Load test on DC shunt motor
5. Load test on DC shunt Generator
6. Constructional study of machine and engine parts using their cut sections.
7. Identification and testing of different electronic devices like diode, BJT, FET, SCR, IGBT, MOSFET, UJT etc.,
8. Practice soldering with simple electronic components on PCB.
9. V-I Characteristics of PN junction diode
10. Characteristics of Bipolar Junction Transistor

II Semester	L	T	P	C
	0	0	3	1.5

BASIC ENGINEERING & IT WORKSHOP

(18ME2L09)

Engineering Workshop

1. Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

2. Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

3. Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

4. Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop 4. Funnel

IT Workshop

1. Identification of computer peripherals, installation of OS and troubleshooting.
2. Orientation and practice on MS Word.
3. Orientation and practice on MS Excel.
4. Orientation and practice on MS Power Point.
5. LAN & Wi-Fi Network connectivity using TCP/IP settings and customization of web browsers.
6. Introduction to HTML and design of basic web page.

III

SEMESTER

SYLLABUS

III Semester	L	T	P	C
	3	0	0	3

COMPLEX VARIABLES & NUMERICAL METHODS (CVNM) (18ME3T01)

(Common to EEE & ME)

UNIT-I: Analytic Functions

Introduction, Complex function, Limit and continuity of a complex function, Derivative of f(z), Analytic functions, Harmonic functions & orthogonal system, Milne-Thomson method.

Applications: Applications to flow problems.

UNIT-II: Integration and Series Expansions

Complex integration, Cauchy's theorem and Cauchy's integral formula (without proofs), Series of complex terms, Taylor's series and Laurent's series (without proofs).

UNIT-III: Integration using Residues

Zeros & singularities of an analytic function, Residues, Residue theorem (without proof), Calculation of residues. Evaluation of integrals of the type (a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta,\sin\theta)d\theta$ (c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$ (d) Integrals by indentation

UNIT IV: Numerical Solution of Equations:

Solution of Algebraic and transcendental equations: Bisection method, Method of false position and Newton-Raphson method (one variable and non-linear simultaneous equations).

Iterative methods of solution of linear simultaneous equations: Jacobi's and Gauss-Seidel iteration methods.

UNIT V: Numerical Integration & Numerical Solution of ODE:

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rules.

Numerical Solution of ODE: Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of 4th order.

Text Books:

3. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
4. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

3. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
4. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

III Semester	L	T	P	C
	2	1	0	3

MECHANICS OF SOLIDS (18ME3T02)

UNIT – I

SIMPLE STRESSES &STRAINS : Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress-strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain, Relation between elastic constants – Bars of varying section – composite bars – Temperature stresses- Compound Stresses - Principal planes and principal stresses - Mohr's circle -, Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

SHEAR FORCE AND BENDING MOMENT: Definition of beam – Types of beams and loads – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

FLEXURAL STRESSES: Theory of simple bending – Assumptions – Derivation of bending equation: M/ I = f/y = E/R, Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

SHEAR STRESSES: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT –IV

DEFLECTION OF BEAMS : Differential equations of the deflection curve, Slope and deflection using double integration method, Macaulay's method and Moment area method for simply supported, cantilever and overhanging beams. Statically Indeterminate Beams and solution methods.

TORSION: Introduction-Derivation of torsion equation- Torsion of Circular shafts- Pure Shear- Transmission of power by circular shafts, Shafts in series, Shafts in parallel.

UNIT – V

THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of

thin cylinders – Riveted boiler shells – Thin spherical shells.

THICK CYLINDERS: –lame's equation – cylinders subjected to inside & outside pressures – compound cylinders.

COLUMNS: Buckling and Stability, Columns with Pinned ends, Columns with other support Conditions, Limitations of Euler's Formula, Rankine's Formula.

Text Books:

1. GH Ryder, Strength of materials, 3/e, Mc Millan publishers IndiaLtd, 1983.
2. Popov, Mechanics of Solids, 2/e, New Pearson Education, 2015.
3. Timoshenko, Strength of Materials Part-I& II, 3/e, CBS Publishers, 2004.

References:

1. U.C Jindal, Strength of Materials, Pearson Education, 2012.
2. Junnarkar S. B, Mechanics of Structures, Vol-III Charotar, 1974.
3. SS Rattan, Strength of materials, 3/e, Tata McGraw-Hill, 2016.
4. Andrew Pytel, Ferdinand Leon Singer, Strength of Materials, 4/e, Harper & Row, 2007.

III Semester	L	T	P	C
	2	1	0	3

KINEMATICS OF MACHINES (18ME3T03)

UNIT – I

MECHANISMS : Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully constrained and incompletely constrained .

Grublers criterion, Grashoff's law , Degrees of freedom, Kutzbach criterion for planar mechanisms, Mechanism and machines – classification of machines – kinematic chain – inversion of mechanism – inversion of mechanism – inversions of quadric cycle, chain – single and double slider crank chains.

UNIT – II

LOWER PAIR MECHANISM: Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russel – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

Conditions for correct steering – Davis Steering gear, Ackermans steering gear – velocity ratio; Hooke's Joint: Single and double – Universal coupling–application–problems.

UNIT – III

KINEMATICS: Velocity and acceleration – Motion of a link in machine – Determination of Velocity and acceleration diagrams – Graphical method – Application of relative velocity method four bar chain. Velocity and acceleration analysis of for a given mechanism, Kleins construction, Coriolis acceleration, determination of Coriolis component of acceleration.

Plane motion of body: Instantaneous centre of rotation, centroids and axodes – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT – IV

CAMS

Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion: Uniform velocity, Simple harmonic motion and uniform acceleration and retardation. Maximum velocity and maximum acceleration during outward and return strokes

in the above 3 cases. Analysis of motion of followers: Roller follower – circular cam with straight, concave and convex flanks.

Power Transmissions : Introduction, Belt and rope drives, selection of belt drive- types of belt drives, V-belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains- length, angular speed ratio, classification of chains.

UNIT – V

GEARS

Higher pairs, friction wheels and toothed gears–types – law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.

GEAR TRAINS: Introduction to gear Trains, Train value, Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Theory of Mechanisms and machines, A.Ghosh & A.K.Malik , 4/e,East West Press Pvt. Ltd,2011
2. Theory of Machines, S.S.Rattan ,4/e, Tata Mc-Graw Hill, 2014
3. Theory of machines and Mechanisms – J.J Uicker, G.R.Pennock & J.E.Shigley, 3/e Oxford publishers,2009.

REFERENCES:

1. Theory of Machines and Mechanisms, J.E.Shigley ,4/e, Oxford, 2014
2. Theory of Machines & Mechanisms, P.L.Ballaney, 25/e, Khanna Publishers, Delhi, 2003
3. Mechanism and Machine Theory by Ashok G. Ambekar, 1/e PHI Publishers,2007.
4. The Theory of Machines, by Bevan (Author), 3/e Paperback,2009
5. Kinematics of Machinery through Hyper Works,J.S. Rao,18 volume,Springer Publ,2001
6. Theory of machines and Machinery,Vickers,4/e, Oxford 2014

III Semester

L	T	P	C
2	1	0	3

THERMODYNAMICS (18ME3T04)

UNIT I

INTRODUCTION: BASIC CONCEPTS: Macroscopic and microscopic viewpoints, definitions of thermodynamic terms, quasi – static process, point and path function, forms of energy, ideal gas and real gas, Zeroth law of thermodynamics.

FIRST LAW OF THERMODYNAMICS: Joule's experiment - first law of thermodynamics, corollaries-perpetual motion machines of first kind, first law applied to non-flow and flow process-limitations of first law of thermodynamics**.**

UNIT II

SECOND LAW OF THERMODYNAMICS: Kelvin - Planck statement and Clausius statement and their equivalence, corollaries - perpetual motion machines of second kind - reversibility and irreversibility, cause of irreversibility - Carnot cycle, heat engine, heat pump and refrigerator, Carnot theorem, Carnot efficiency.

UNIT III

ENTROPY: Clausius inequality - Concept of Entropy- entropy equation for different processes and systems

AVAILABILITY AND IRREVERSIBILITY: Definition of exergy and energy, expressions for availability and irreversibility. Availability in steady flow, non-flow processes and irreversibility.

UNIT IV

PROPERTIES OF STEAM AND USE OF STEAM TABLES: Pure Substances, P-V-T surfaces, T-s and h-s diagram, Mollier chart, dryness fraction, property tables, analysis of steam undergoing various thermodynamic processes using Mollier chart– steam calorimetry.

UNIT V

AIR STANDARD CYCLES: Otto, Diesel and dual cycles, P-V and T -S diagrams - description and efficiencies, mean effective pressures. Comparison of Otto, Diesel and dual cycles

Refrigeration cycle: Rankine cycle, Brayton cycle.

TEXT BOOK(S)

1. P.K.Nag, Engineering Thermodynamics, 5/e, Tata McGraw Hill, 2013.
2. Yunus A. Cengel, Michaela A. Boles, Thermodynamics, 7/e, Tata McGraw Hill, 2011.

REFERENCES

1. J.B.Jones and G.A.Hawkins, Introduction to Thermodynamics, 2/e, John Wiley & Sons, 2012.
2. Moran, Michael J. and Howard N. Shapiro, Fundamentals of Engineering Thermodynamics, 3/e, Wiley, 2015
3. Claus Borgnakke Richard E. Sonntag, Fundamentals of Thermodynamics, 7/e, Wiley, 2009
4. R.K. Rajput, S.Chand& Co., Thermal Engineering, 6/e, Laxmi publications, 2010.

III Semester

L	T	P	C
3	0	0	3

MATERIALS SCIENCE AND ENGINEERING
(18ME3T05)

UNIT – I

STRUCTURE OF METALS AND CONSTITUTION OF ALLOYS: Bonds in Solids, Crystal structure of metals, grains and grain boundaries, determination of grain size and effect of grain size on the mechanical properties of metal / alloys. Necessity of alloying, types of solid solutions, Hume Rothery's rules.

UNIT –II

EQUILIBRIUM DIAGRAMS: Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, equilibrium cooling and heating of alloys, Lever rule, eutectic systems, peritectic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoid reactions, phase rule, relationship between equilibrium diagrams and properties of alloys. Study of important binary phase diagrams of Pb-Sn, Fe-Fe3C, Cu-Ni and Al-Cu.

UNIT –III

CAST IRONS AND STEELS: Extraction of Iron, Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheroidal graphite cast iron, applications of cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, Maraging steels, tool and die steels.

UNIT – IV

HEAT TREATMENT OF ALLOYS: Effect of alloying elements on Fe-Fe3C system, Annealing, normalizing, hardening, TTT diagrams, tempering, hardenability, surface - hardening methods, Age hardening treatment, Cryogenic treatment of alloys.

UNIT – V

NON-FERROUS METALS AND ALLOYS: Structure and properties of Copper and its alloys, Aluminium and its alloys, Titanium and its alloys.

CERAMIC AND COMPOSITE MATERIALS: Crystalline ceramics, glasses, cermets, abrasive materials, nanomaterials – definition, properties and applications. Classification of composites, various methods of component manufacture of composites, particle reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal matrix composites and C – C composites.

PLASTICS: Introduction to plastics and polymers, Types of plastics and Composites based on plastics.

Text Books:

1. Essential of Materials science and engineering - Donald R. Askeland and Wendelin J. Wright, Global Engineering Publisher, 4th edition, 2019.
2. Introduction to Physical Metallurgy - Sidney H. Avener, McGrawHill Publishers, 2nd edition and 2017.

References:

1. Material Science and Metallurgy – Dr. V.D.Kodgire, Everest Publishers, 31st edition and 2011.
2. Materials Science and engineering - Callister & Balasubramanian, Wiley Publications, 9th edition and 2015.
3. Material Science for Engineering students – Traugott Fischer – Elsevier Publisher and 2009.
4. Material science and Engineering - V. Rahghavan, PHI Publisher, 6th edition, and 2015.
5. Introduction to Material Science and Engineering – Yip-Wah Chung, CRC Press 1st edition and 2006
6. Material Science and Metallurgy – A V K Suryanarayana, B S Publications 1st edition and 2014.
7. Material Science and Metallurgy – U. C. Jindal – Pearson Publications, 1st edition and 2011.
8. Physical Metallurgy- Vijendra Singh- Standard Publishers, 1st edition, and 2005.

III Semester

L	T	P	C
3	0	0	3

FLUID MECHANICS & HYDRAULIC MACHINES
(18ME3T06)

UNIT-I

Fluid statics: definition of fluid, continuum, dimensions and units, properties of fluids – specific gravity, viscosity and its significance, compressibility, surface tension, capillarity, vapor pressure and manometry, Pascal's law, hydrostatic law.

Buoyancy and floatation: Meta center, stability of floating body. Submerged bodies. Calculation of metacenter height. Stability analysis and applications.

Fluid kinematics: Methods of Analysis- System and control volume, Classification of flows-steady and unsteady, uniform and non-uniform, laminar and turbulent, rotational and irrotational, viscous and inviscid, internal and external flows, Continuity equation. Kinematics-stream tube, stream function, circulation and vorticity, stream function and potential function, condition for irrotational flow.

UNIT-II

Fluid dynamics: Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its applications- force on pipe bend, Measurement of flow - Venturimeter, Orificemeter and pitot tube, stagnation properties.

Closed conduit flow: Reynolds's experiment – Darcy-Weisbach equation – minor losses in pipes – pipes in series and pipes in parallel – total energy line – hydraulic gradient line.

UNIT-III

Boundary Layer Theory: concept of boundary layer, displacement, momentum and energy thickness, separation of boundary layer, measures of controlling boundary layer thickness.

Dimensional Analysis: Fundamental and derived dimensions, Rayleigh method, Buckingham theorem, dimensionless groups, application of dimensional groups, model testing and similitude, types of similarity- geometric, kinematic and dynamic.

UNIT-IV

Impact of Jets: Impulse momentum equation, Hydrodynamic force of jet striking stationary and moving-vanes, flat and curved vanes, centrally and tangentially, series of vanes, radial vanes, velocity triangles, work done and efficiency

Hydraulic Turbines: Classification of hydraulic turbines- Impulse and Reaction turbines, Pelton, Francis and Kaplan turbines, working principles, draft tube– theory and its functions, Unit and

specific quantities, performance curves.

UNIT-V

Rotodynamic Pumps: Classification – mixed, axial, construction, principle and application. **Centrifugal pumps**- Classification, working principle, work done by impeller, specific speed, performance characteristic curves, cavitation & NPSH.

Positive displacement Pumps: Working - gear pump, vane pump, rotary piston pump,

Reciprocating pump - Working, Slip, Indicator diagrams, Air vessels.

TEXT BOOKS

1 Hydraulics & Fluid Mechanics Including Hydraulics Machines, Dr. P.N. Modi & Dr. S.M. Seth,RajsonsPubl, 21st Ed.,2017.
2 Fluid Mechanics and Hydraulic Machines, R. K. Bansal, Laxmi Publ.,10th Ed., 2018.

REFERENCES BOOKS

1 Fluid Mechanics and Hydraulic Machines, R.K. Rajput, S. Chand Publ., 6thEd., 2015.
2 Fluid Mechanics and Machinery, D. Ramadurgaiah, New-age International, 1st Ed., 2002.
3 Fluid Mechanics & Hydraulic Machines, T.R. Banga& S.C. Sharma, Khanna Publ.,16th Ed., 2016.
4 Fluid Mechanics and Hydraulic Machines,V.M. Domkundwar&A.V. Domkundwar, Dhanpat Rai & Co. 2014.

III Semester

L	T	P	C
0	0	3	1.5

FLUID MECHANICS & HYDRAULIC MACHINES LAB (18ME3L07)

1. Experimental Verification of Bernoulli's Theorem.
2. Calibration of Venturimeter.
3. Calibration of Orifice meter.
4. Determination of friction factor for a given pipe line.
5. Determination of loss of head due to sudden contraction in a pipeline.
6. Turbine flow meter.
7. Impact of jets on Vanes.
8. Performance Test on Pelton Wheel.
9. Performance Test on Francis Turbine.
10. Performance Test on Single Stage Centrifugal Pump.
11. Performance Test on Multi Stage Centrifugal Pump.
12. Performance Test on Reciprocating Pump.

III Semester	L	T	P	C
	0	0	3	1.5

MECHANICS OF SOLIDS & METALLURGY LAB

(18ME3L08)

NOTE: Any 6 experiments from each section A and B.

(A) MECHNICS OF SOLIDS LAB:

1. Direct tension test
2. Bending test on
    a) Simple supported beam
    b) Cantilever beam
3. Torsion test
4. Hardness tests
    a) Brinells hardness test
    b) Rockwell hardness test
5. Test on springs
6. Compression test on cube
7. Impact test
8. Punch shear test

(B) METALLURGY LAB:

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Microstructure of Mild steels, low carbon steels, high – C steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys.
5. Study of the Micro structures of Heat treated steels.
6. Hardenability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

III Semester	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

PROFICIENCY THROUGH READING AND WRITING (18ME3L09)

Unit I Vocabulary Building

1.1 The concept of word formation

1.2. Root words from foreign languages and their use in English

1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives

1.4 Synonyms, antonyms, and standard abbreviations

Unit II Writing Skills

2.1 Organizing principles of paragraphs in documents

2.2 Creative writing

2.3 Essay writing

Unit III Identifying Common Errors in Writing

3.1 Subject-verb agreement

3.2 Noun-pronoun agreement

3.3 Misplaced modifiers

3.4 Articles

3.5 Prepositions

3.6 Redundancies

3.7 Clichés

Unit IV Comprehension

4.1 Scanning

4.2 Skimming

4.3 Identifying the main ideas

Unit V Reading for Pleasure

5.1 Review of an autobiography/biography

5.2 Review of a novel

5.3 Review of a self help book

Suggested Readings:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007.
3. On Writing Well. William Zinsser. Harper Resource Book. 2001.
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

IV

SEMESTER

SYLLABUS

IV Semester	L	T	P	C
	2	1	0	3

PROBABILITY & STATISTICS (P & S) (18ME4T01)

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties. Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties.

Continuous distribution: Normal distributions, Normal approximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Central limit theorem- t-distribution- Sampling distribution of means (s unknown)- Sampling distribution of variances -χ^2 and F-distributions- Point estimation- Maximum error of estimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means-Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares-Goodness of fit. Correlation and Regression – Properties.

Text Books:

1. Richards A Johnson, Irvin Miller and Johnson E Freund. Probability and Statistics for Engineering, 9th Edition, PHI.
2. Jay l.devore, Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

1. ShronL.Myers, Keying Ye, Ronald E Walpole, Probability and Statistics Engineers and the Scientists,8th Edition, Pearson 2007.
2. William Menden Hall, Robert J. Bever and Barbara Bever, Introduction to probability and statistics, Cengage learning, 2009.

IV Semester

L	T	P	C
3	0	0	3

PRODUCTION TECHNOLOGY (18ME4T02)

UNIT – I

CASTING: Steps involved in making a casting. Patterns – Types of patterns – Materials used for patterns, pattern allowances, Gating ratio and design of Gating systems. Risers – Types, function and design, casting design considerations. Gases in metals.

Solidifications. General defects in castings. Basic principles and applications of Centrifugal casting Die casting and Investment casting-advantages, disadvantages and applications.

UNIT – II

WELDING: Classification of welding processes, types of welded joints and their characteristics, Gas welding, Different types of flames and uses, Oxy – Acetylene Gas cutting. Basic principles of Arc welding, Manual metal arc welding, Submerged arc welding, Inert Gas welding- TIG & MIG welding- advantages, disadvantages and applications.

UNIT – III

ADVANCED WELDING PROCESSES: Resistance welding, Solid state welding processes- Friction welding, Forge welding, Explosive welding; Thermit welding, Plasma welding, Laser welding, electron beam welding, Soldering & Brazing.

Heat affected zones in welding; Welding defects – causes and remedies – destructive and non-destructive testing of welds, Design of welded joints.

UNIT – IV

PLASTIC DEFORMATION: Hot working and Cold working, Strain hardening and Annealing. Bulk forming processes: Forging - Smith forging, Drop Forging, Roll forging, Forging hammers, Rotary forging, forging defects; Rolling – fundamentals, types of rolling mills and products, Forces in rolling and power requirements. Extrusion and its characteristics. Types of extrusion, Impact extrusion, Hydrostatic extrusion; Wire drawing and Tube drawing. Introduction to powder metallurgy – compaction and sintering, advantages and applications.

UNIT – V

SHEET METAL FORMING: - Blanking and piercing, Forces and power requirement in these operations, Deep drawing, Stretch forming, Bending, Spring back and its remedies, Coining, Spinning, Types of presses and press tools. High energy rate forming processes: Principles of explosive forming, electromagnetic forming, Electrohydraulic forming, rubber pad forming, advantages and limitations.

Processing of Plastics: Types of Plastics, Properties, Applications and their processing methods, Blow and Injection moulding.

Text Books:

1. Manufacturing Technology -Vol I- P.N. Rao, 1st edition, Tata McGraw Hill Education and 2013
2. Fundamentals of Modern Manufacturing Materials, Processes, and Systems by Mikell P. Groover. John Wiley publications, 4th edition and 2010.

References:

1. Manufacturing Science – A.Ghosh & A.K.Malik – East West Press Pvt. Ltd, 2nd edition and 2010.
2. Process and materials of manufacture- Allyn and Bacon, PHI publisher, 4th Edition, 1990.
3. Production Technology- R.K. Jain, Khanna Publisher 1st edition and 2015.
4. Production Technology-P C Sharma-S. Chand, 1st edition and 2006.
5. Manufacturing Processes- H.S. Shaun- Pearson publication, 1st edition and 2012.
6. Manufacturing Processes- J.P. Kaushish- PHI publication, 1st edition and 2010.

IV Semester

L	T	P	C
2	1	0	3

DESIGN OF MACHINE ELEMENTS (18ME4T03)

Unit I

Mechanical Engineering Design: Design process, design considerations, codes and standards of designation of materials, selection of materials, preferred numbers.

Design for Static Loads: Modes of failure, Factor of safety, design of components subjected to axial, bending, torsional and impact loads. Design for Theories of failure for static loads.

Unit II

Design for Dynamic Loads: Stress concentration, Types of fluctuating stresses, Endurance limit, Notch sensitivity, fatigue strength under axial, bending and torsion, fatigue design for infinite life. Fatigue theories of failure, Soderberg, Goodman and modified Goodman criterion for fatigue failure. Fatigue design under combined stresses.

Unit III

Design of Bolted Joints: Threaded fasteners, preload of bolts, various stresses induced in the bolts. Torque requirement for bolt tightening, eccentrically loaded bolted joints, gasketed joints.

Riveted Joints: Design of lap, butt and eccentrically loaded joints, failure and efficiency of riveted joints.

Welded Joints: Strength of lap and butt welds, eccentrically loaded welded joints. Joints subjected to bending and torsion.

Unit IV

Design of Cotters and Knuckle Joints: cotter joints-spigot and socket, sleeve and cotter, jib and cotter joints-knuckle joints.

Power Transmission Shafts: Design of shafts subjected to bending, torsion and axial loading. Shafts subjected to fluctuating loads using shock factors. Shaft design on torsional rigidity basis.

Unit V

Keys: Function, types, design of sunk, saddle, Kennedy and Woodruff keys.

Couplings: Design of rigid, flange and bushed pin couplings, universal coupling.

Springs: Design of helical compression, tension, torsion springs. Design against fluctuating loads, concentric springs and leaf springs.

Text Book(s)

1. V.B.Bhandari, Design of Machine Elements, Tata McGraw Hill, 3/e, 2010.
2. J.E. Shigley, Mechanical Engineering Design, Tata McGraw Hill, 2/e, 1986.

References

1. R.L. Norton, Machine Design an Integrated approach, 2/e, Pearson Education, 2004.
2. R.K. Jain, Machine Design, Khanna Publications, 1978.
3. M.F.Spotts and T.E.Shoup, Design of Machine Elements, 3/e, Prentice Hall (Pearson Education), 2013.

Note: Design data book is permitted.

IV Semester

L	T	P	C
2	1	0	3

I.C.ENGINES & AIR COMPRESSORS (18ME4T04)

UNIT – I

I.B. Engines: Classification - Working principles, Valve and Port Timing Diagrams, - Engine systems – Fuel, Carburetor, Fuel Injection System, Ignition, Cooling and Lubrication, principle of Wankle engine, Principles of supercharging and turbo charging.

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blow down-Loss due to Gas exchange process, Volumetric Efficiency. Loss due to Rubbing Friction, Actual and Fuel-Air Cycles of CI Engines.

UNIT – II

Combustion in S.I. Engines: Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Types of Abnormal combustion, pre-ignition and knocking (explanation of) – Fuel requirements and fuel rating, antiknock additives – combustion chamber – requirements, types.

Combustion in C.I. Engines: Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– open and divided combustion chambers and nozzles used – fuel requirements and fuel rating.

UNIT – III

Measurement, Testing and Performance: Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart.

UNIT – IV

Compressors: Classification – positive displacement and roto dynamic machinery – Power producing and power is absorbing machines, fan, blower and compressor.

Reciprocating Compressor: Principle of operation, work required Isothermal efficiency, volumetric efficiency and effect of clearance, multi stage compression, under cooling, minimum work condition for two stage compression.

UNIT V

Rotary (Positive displacement type): Roots Blower, vane sealed compressor, Lysholm compressor – Mechanical details and principle of working – efficiency considerations.

Dynamic Compressors: Centrifugal compressors: Mechanical details and principle of operation – velocity and pressure variation. Slip factor, power input factor, pressure coefficient and adiabatic coefficient.

Axial Flow Compressors: Mechanical details and principle of operation and degree of reaction, work done factor - isentropic efficiency– Polytropic efficiency.

Text Books:

1 Internal Combustion Engines, V. Ganesan, Tata McGraw Hill, 4th Ed., 2017.
2 Internal Combustion Engine Fundamentals,John B. Heywood**,**McGraw-Hill, 2nd Ed., 2018.

References:

1 Thermal Engineering, R.K. Rajput, Lakshmi Publications, 8th Ed., 2010
2 Internal Combustion Engines, M.L. Mathur & R.P. Sharma, Dhanpath Rai & Sons Publications.
3 Thermal Engineering, R.S. Khurmi& J.S. Gupta, S.Chand Publications, 15th Ed., 2015

IV Semester	L	T	P	C
	1	0	4	3

COMPUTER AIDED MACHINE DRAWING
(18ME4T05)

The following contents are to be done by any 2D CAD software package Conventional representation of materials and components:

Detachable joints: Drawing of thread profiles, hexagonal and square-headed bolts and nuts, bolted joint, bolted joint with washer and locknut, stud joint, screw joint.

Riveted joints: Drawing of rivet, lap joint, butt joint with single strap, single riveted, double riveted double strap joints.

Welded joints: Lap joint and T joint with fillet, butt joint with conventions.

Keys: Taper key, sunk taper key, round key, saddle key, feather key, woodruff key.
Shaft coupling, bushed pin-type flange coupling, universal coupling, Oldhams' coupling.

The following contents to be done by any 3D CAD software package Sectional views

Creating solid models of complex machine parts and create sectional views.

Assembly drawings: (Any four of the following using solid model software)

Lathe tool post, tool head of shaping machine, tail stock, machine vice, gate valve, carburettor, piston, connecting rod, excentric, screw jack, plumber block, axle bearing, pipe vice, clamping device, Geneva cam, universal coupling,

Manufacturing drawing:

Representation of limits, fits and tolerances for mating parts. Use any four parts of above assembly drawings and prepare manufacturing drawing with dimensional and geometric tolerances.

Text Books:

1. K.L.Narayana, P.Kannaiah, A text book on Engineering Drawing, SciTech Publications, 2014

Reference Books:

1. Cecil Jensen, Jay Helsel and Donald D.Voisinet, Computer Aided Engineering Drawing, Tata

Mcgraw-Hill, NY, 2000.

2. James Barclay, Brain Griffiths, Engineering Drawing for Manufacture, Kogan Page Science, 2003.
3. N.D.Bhatt, Machine Drawing, Charotar, 50/e, 2014.
4. K.L.Narayana, Production Drawing, NewAge International Publishers, 3/e, 2014

IV Semester	L	T	P	C
	3	0	0	3

ENGINEERING ECONOMICS & FINANCIAL ANALYSIS (18ME4T06)

(Open Elective-I)

UNIT-I

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics – Nature and Scope of Managerial Economics and its relationship with other subjects – Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting..

UNIT – II

Production and Cost Analyses:

Concept of Production function- Cobb-Douglas Production function- Law of One and Two Variable proportions- choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: Opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs –Cost –Volume-Profit analysis-Determination of Breakeven point(simple problems)- Managerial significance and limitations of Breakeven point.

UNIT – III

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, and Internet Pricing: Flat Rate Pricing, Usage sensitive pricing and Priority Pricing.

UNIT – IV

Types of Business Organization, Business Cycles & Accounting Analysis:

Features and Evaluation of Sole Trader, Partnership, Joint Stock Company — Business Cycles: Meaning and Features – Phases of Business Cycle.

Introduction to Accounting & Financing Analysis:

Book-Keeping and Accounting – Financial Accounting – Concepts and Conventions – Double Entry System – Preparation of Journal, Ledger and Trial Balance – Preparation of Final Accounts – Trading, Profit and Loss Account and Balance Sheet With Adjustment Entries, Simple Problems Only

UNIT – V

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods (pay back period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

TEXT BOOKS

1. Dr. N. AppaRao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House, 2014.
2. V. Maheswari: Managerial Economics, Sultan Chand.2014
3. Suma Damodaran: Managerial Economics, Oxford 2011.
4. VanithaAgarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.
6. Maheswari: Financial Accounting, Vikas Publications.
7. S. A. Siddiqui& A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012
8. Ramesh Singh, Indian Economy, 7th Edn., TMH2015
9. Pankaj Tandon A Text Book of Microeconomic Theory, Sage Publishers, 2015
10. Shailaja Gajjala and Usha Munipalle, Univerties press, 2015

IV Semestr	L	T	P	C
	3	0	0	3

MANAGEMENT INFORMATION SYSTEM (18ME4T07)

(Open Elective-I)

UNIT - I:

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

UNIT - II:

Business Applications of Information Systems: E-Commerce, ERP Systems, DSS, Business Intelligence, and Knowledge Management System.

UNIT- III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

UNIT - IV:

Building of Information Systems: System Development Stages, System Development Approaches, Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods, Detailed system design.

UNIT - V:

Introduction to Cyber Crime: Cyber space; cyber law; e-business; e - consumers; spam; phishing. Cybercrime and information security, cyber criminals , Classification of cyber criminals - Indian Perspectives - Cyber crimes and Indian IT Act 2000, Global perspective on cybercrime - Cybercrime era.

Text Books:

1. Management Information Systems, Laudon & Laudon, Pearson, 2015.
2. Management Information Systems–Managerial Perspective, D P Goyal, MacMillan, 3e Edition, 2010.

References:

3. Management Information Systems Text and Cases, Jawadekar, Tata Mc Graw Hill, 2012.
4. Management Information Systems, Kelkar, Prentice Hall India, 2012.
5. Cyber Security, Nina Godbole & Sunit Belapure, Wiley India, 2012.

IV Semester	L	T	P	C
	3	0	0	3

ENTREPRENEURSHIP & PROJECT MANAGEMENT (18ME4T08)

(Open Elective-I)

UNIT I

Meaning of Entrepreneurship - characteristics, functions and types of entrepreneurship - Intrapreneur - Role of entrepreneurship in economic development- Startups and Entrepreneurs – Key Elements of Entrepreneurial Ecosystem – Opportunities and Challenges – Changing Business Landscape in India during 2000-2015- – corporate entrepreneurship – mobility of entrepreneur – entrepreneurial motivation

UNIT II

Women Entrepreneurship: Role & Importance, Problems of Women Entrepreneurs-– Entrepreneurial Motivation, Performance and Reward – Government Policy & Regulations- Incentives and Subsidies – Support Entrepreneurship through Entrepreneurship Hubs (E- Hubs) – Listing Rules for Startups.

UNIT III

Project Management: Meaning of project - concepts - categories - project life cycle, phases - characteristics of a project – project manager - role and responsibilities of project manager.

UNIT IV

Project identification - selection - project formulation – contents of a project report - planning commission guidelines for formulating a project - specimen of a project report.

UNIT V

Source of finance for a project - Institutional finance supporting projects project evaluation - objectives - types - methods.

Relevant cases have to be discussed in each unit.

TEXT BOOKS

1. Ram Chandran, ‘Entrepreneurial Development’, Tata McGraw Hill, New Delhi
2. Saini, J. S., ‘Entrepreneurial Development Programmes and Practices, Deep & Deep Publications (P), Ltd.

REFERENCE

1. Khanka, S S. 'Entrepreneurial Development', S Chand & Company Ltd. New Delhi

2. Badhai, B 'Entrepreneurship for Engineers', Dhanpat Rai & co. (p) Ltd.

3. Desai, Vasant, 'Project Management and Entrepreneurship', Himalayan Publishing House, Mumbai, 2002.

4. Gupta and Srinivasan, 'Entrepreneurial Development', S Chand & Sons, New Delhi.

IV Semester

L	T	P	C
0	0	3	1.5

PRODUCTION TECHNOLOGY LAB (18ME4L09)

Minimum of 12 Exercises need to be performed

I. METAL CASTING:

1. Pattern Design and making - for one casting drawing.
2. Sand properties testing - for strength and permeability.
3. Mould preparation, Melting and Casting.

II WELDING:

1. Gas welding
2. Gas cutting
3. Manual metal arc welding - Lap & Butt Joints
4. TIG/MIG Welding
5. Resistance Spot Welding
6. Brazing and soldering

III METAL FORMING:

1. Blanking & Piercing operations.
2. Perform V-bending operation using hydraulic press.

IV PROCESSING OF PLASTICS

1. Injection Moulding
2. Blow Moulding

IV Semester

L	T	P	C
0	0	3	1.5

THERMAL ENGINEERING LAB (18ME4L10)

1. I.C. Engines valve / Port timing diagrams.
2. I.C. Engines performance test and Exhaust emission measurements (4 -stroke diesel engine).
3. I.C. Engines performance test and Exhaust emission measurements (2-stroke petrol engine).
4. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine.
5. Determination of FP by retardation and motoring test on IC engine.
6. I.C. Engines heat balance at different loads and show the heat distribution curve.
7. Performance test on variable compression ratio engines.
8. Performance test on reciprocating air compressor unit.
9. Performance Test on Refrigeration Tutor.
10. Economical speed test of an IC engine.
11. Disassembly/assembly of Engines.
12. Study of boilers, mountings and accessories.

IV Semester

L	T	P	C
2	0	0	0

INDIAN CONSTITUTION (18ME4T11)

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy
- (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details

IV Semester

L	T	P	C
0	0	0	1

SUMMER INTERNSHIP (18ME4I12)

V

SEMESTER

SYLLABUS

V Semester	L	T	P	C
	2	1	0	3

DYNAMICS OF MACHINERY (18ME5T01)

UNIT – I

PRECESSION: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships, static and dynamic force analysis of planar mechanisms, (Demonstration of models in video show).

CLUTCHES: Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear Friction clutches- single disc or plate clutch, multiple disc clutch, cone clutch, centrifugal clutch

UNIT – II

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. General description and operation of dynamometers: Prony, Rope brake, Epicyclic, Bevis Gibson and belt transmission.

GOVERNERS: Watt, porter and proell governors, spring loaded governors – Hartnell and Hartung with auxiliary springs. sensitiveness, isochronism and hunting.

UNIT – III

TURNING MOMENT DIAGRAMS: Dynamic force analysis of slider crank mechanism**,** inertia torque, angular velocity and acceleration of connecting rod, crank effort and turning moment diagrams – fluctuation of energy – fly wheels and their design.

UNIT – IV

BALANCING: Balancing of rotating masses single and multiple – single and different planes, use analytical and graphical methods. Primary, secondary, and higher balancing of reciprocating masses. analytical and graphical methods, unbalanced forces and couples – examination of "V" multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing, hammer blow, swaying couple, variation of tractive effort.

UNIT – V

VIBRATIONS: Free Vibration of spring mass system –Natural frequency-types of damping – damped free vibration, Simple problems on forced damped vibration, vibration isolation and transmissibility transverse loads, vibrations of beams with concentrated and distributed loads. Dunkerly's methods,

Raleigh's method, whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

Text Books :

1. Theory of Machines / S.S Rattan/ Mc. Graw Hill
2. Mechanism and machine theory /Ashok G. Ambedkar/PHI Publications.

References :

1. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
2. Theory of Machines / Shigley / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers
4. Theory of machines / Khurmi/S.Chand.

V Semester	L	T	P	C
	3	0	0	3

MANAGEMENT SCIENCE & PRODUCTIVITY (18ME5T02)

Unit 1

INTRODUCTION: Definition of Industrial Engineering (IE) - Development, Applications, Role of an industrial engineer, Differences between production management and industrial engineering, Quantitative tools of IE and productivity measurement. Concepts of management, importance, functions of management. Scientific Management – Taylor's principles. Theory X and Theory Y. Fayol's principles of management.

Unit 2

PLANT LAYOUT: Factors governing plant location, types of production layout, Advantages and disadvantages of product layout and process layout. Applications, Quantitative techniques for optimal design of layouts, Plant maintenance, Preventive and breakdown maintenance.

Unit 3

OPERATIONS MANAGEMENT: Importance, Types of production, Applications, Work study, Method study and Time study, Work sampling, PMTS, micro-motion study, rating techniques, MTM, Work factor system, Principles of Ergonomics, Flow process charts, string diagrams and Therbligs.

Unit 4

STATISTICAL QUALITY CONTROL: Quality Control, its importance, SQC, Sampling, Inspection, Types. Control charts, X bar and R charts, X bar and S charts and their applications. Numerical examples.

TOTAL QUALITY MANAGEMENT: Zero-defect concept, Quality circles, Implementation, Applications, ISO quality systems, Six sigma – definition, basic concepts.

Unit 5

RESOURCE MANAGEMENT: Concept of Human Resource Management (HRM), Personnel Management and Industrial Relations, functions of personnel management, Job evaluation, its importance and types, merit rating, quantitative methods, wage incentive plans, types.

VALUE ANALYSIS: Value Engineering, implementation procedure, Enterprise Resource Planning (ERP), Supply Chain Management (SCM). PERT and CPM, differences and applications, Critical path, determination of floats, importance, project crashing, smoothing and numerical examples.

Books:

(1) Industrial Engineering and Management by O.P.Khanna, Khanna Publishers.

(2) Industrial engineering and Production Management by Martand Telsang S.Chand & Company Ltd.,, New Delhi.

Reference Books:

(1) Operations Management **by** J.G.Monks, Mc Graw Hill Publishers.
(2) Industrial Engineering by Banga and Sharma.
(3) Principles of Management by Koonz and O'Donell, Mc Graw Hill Publishers.
(4) Statistical Quality Control by Gupta.
(5) Industrial Engineering and Management by Raju, Cengage Publishers.

V Semester	L	T	P	C
	3	0	0	3

TURBOMACHINES (18ME5T03)

UNIT – I

Basic Concepts: Rankine cycle - schematic layout, thermodynamic analysis, concept of mean temperature of heat addition, methods to improve cycle performance – regeneration & reheating. Combustion: fuels and combustion, concepts of heat of reaction, adiabatic flame temperature, Stoichiometry, flue gas analysis.

UNIT – II

Boilers: Classification – working principles of L.P & H.P boilers with sketches – mountings and accessories-working principles, boiler horse power, equivalent evaporation, efficiency and heat balance – draught, classification – height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – artificial draught, induced and forced.

UNIT – III

Steam Nozzles: Function of a nozzle – applications - types, flow through nozzles, thermodynamic analysis-assumptions -velocity of fluid at nozzle exit-Ideal and actual expansion in a nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

Steam Turbines: Classification – impulse turbine; mechanical details – velocity diagram – effect of friction-power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency. De-Laval turbine - methods to reduce rotor speed-velocity compounding, pressure compounding and velocity & pressure compounding, velocity and pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine, condition for maximum efficiency.

UNIT – IV

Reaction Turbine: Mechanical details – principle of operation, thermodynamic analysis of a stage, degree of reaction –velocity diagram – Parson's reaction turbine – condition for maximum efficiency – calculation of blade height.

Steam Condensers: Requirements of steam condensing plant – classification of condensers – working principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, air pump- cooling water requirement.

UNIT – V

Gas Turbines: Simple gas turbine plant – ideal cycle, essential components – parameters of performance – actual cycle – regeneration, inter cooling and reheating –closed and semi-closed cycles – merits and demerits, types of combustion chambers.

Jet Propulsion: Principle of operation –classification of jet propulsive engines – working principles with schematic diagrams and representation on t-s diagram - thrust, thrust power and propulsion efficiency – turbo jet engines – needs and demands met by turbo jet – schematic diagram, thermodynamic cycle, performance evaluation, thrust augmentation – methods.

Rockets: Application – working principle – classification – propellant type – thrust, propulsive efficiency – specific impulse – solid and liquid propellant rocket engines.

TEXT BOOKS:

1. Thermodynamics and Heat Engines/R.Yadav, Volume -II /Central Publishing House
2. Gas Turbines /V.Ganesan /TMH
3. Heat Engineering /V.P Vasandani and D.S Kumar/Metropolitan Book Company, New Delhi

REFERENCES:

1. Gas Turbines and Propulsive Systems /P.Khajuria & S.P.Dubey /Dhanpatrai
2. Gas Turbines / Cohen, Rogers and Saravana Muttoo / Addison Wesley – Longman
3. Thermal Engineering-R.S Khurmi, &J S Gupta/S.Chand.
4. Thermal Engineering-P.L.Bellaney/ Khanna publishers
5. Thermal Engineering-M.L.Marthur & Mehta/Jain bros. Publishers
6. Thermal Engineering / RK Rajput/ Lakshmi Publications

V Semester	L	T	P	C
	3	0	0	3

METAL CUTTING AND MACHINE TOOLS (18ME5T04)

UNIT I: Material Removal Processes:

Metal Cutting: Single and multi-point cutting, orthogonal cutting, various force components, chip formation and is types, tool wear and tool life, Merchants force diagram, machinability, cutting tool materials, cutting fluids, coatings.

UNIT II: Machining processes for round shapes:

Lathe and Lathe Operations: Principles of working, specifications, types of lathes, operations performed, work holders and tool holders. Taper turning, thread turning attachments for lathes. machining time calculations. Turret and capstan lathes - Principle of working, collect chucks, other work holders - tool holding devices.

Boring and Boring Machines- Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of boring tools

Drilling and Drilling Machines: Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of twist drill.

Reaming and Reamers: Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of reamers.

Taping and Taps: Principles of working, specifications, types, and operations performed - tool holding devices - nomenclature of taps.

UNIT III: Machine processes for other shapes:

Milling operations and Milling machines - Principles of working, specifications, classifications of milling machines, machining operations, types and geometry of milling cutters, methods of indexing, and accessories to milling machines, machining time calculations.

Shaping, Slotting and planning machines - Principles of working - principal parts, specification, classification, operations performed, machining time calculations

UNIT IV: Abrasive Machining:

Grinding and grinding machines: Grinding process, types of grinding machines, grinding process

parameters, honing, lapping, other finishing processes.

UNIT V

Jigs and Fixtures Principles of design of Jigs and fixtures and uses, 3-2-1 principle of location and clamping, classification of Jigs & Fixtures, types of clamping and work holding devices, typical examples of jigs and fixtures.

Textbooks:

1. P.N. Rao, Manufacturing Technology: Metal Cutting and Machine Tools, (Volume 2), 3/e, Tata McGraw-Hill Education, 2013
2. R.K. Jain and S.C. Gupta, Production Technology, 17/e, Khanna Publishers, 2012.

Reference books:

1. Kalpakzian S and Schmid SR, Manufacturing Engineering and Technology, 7/e, Pearson, 2018.
2. Milton C.Shaw , Metal Cutting Principles, 2/e, Oxford, 2012
3. Hindustan Machine Tools, Production Technology, TMH, 2001
4. V.K.Jain, Advanced Machining Process,12/e, Allied Publications, 2010
5. AB. Chattopadhyay, Machining and Machine Tools, 2/e, Wiley, 2017
6. Halmi A Yousuf & Hassan, , Machine Technology: Machine Tools and Operations, CRC Press Taylor and Francis Group, 2008

V Semester	L	T	P	C
	3	0	0	3

INTERNET OF THINGS (18ME5T05)

(OPEN ELECTIVE-2)

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT):

Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT EnablingTechnologies,IoTlevelsanddeployment,domainspecificIoTs.

UNIT-II

IoT AND M2M:

Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY:

IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT referencemodel.Logical design using Python: Installing Python, Python data types and data structures, control flow, functions, modules, packages, file handling.

UNIT-IV

IoT PHYSICAL DEVICES AND ENDPOINTS:

Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-V

IoT PHYSICAL SERVERS AND CLOUD OFFERINGS:

Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

Text Books:

1. ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on-Approach”, VPT, 1stEdition, 2014.
2. Matt Richardson, Shawn Wallace, “Getting Started with Raspberry Pi”, O’Reilly (SPD), 3rdEdition, 2014.

Reference Books:

1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, John Wiley andSons2014.

Web References:

1.https://www.upf.edu/pra/en/3376/22580.

2. https://www.coursera.org/learn/iot

3. https://bcourses.berkeley.edu.

4. www.innovianstechnologies.com.

E-Text Books:

1. https://mitpress.mit.edu/books/internet-things
2. https://www.apress.com/in

V Semester	L	T	P	C
	3	0	0	3

EMPLOYABILITY SKILLS-1 (18ME5T06)

(Quantitative Aptitude and Reasoning)

(OPEN ELECTIVE-2)

Unit-I: Divisibility and remainder rules of numbers,
Unit digit , square root, cube root and simplification of numbers,
HCF and LCM of numbers, Averages and Percentages
Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II: Profit & loss, Simple interest and Compound interest

Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III: Ratio & proportions, Partnership, Alligation and mixtures and Ages**.**

Data sufficiency, Inequalities and Decision making .

Unit-IV: Time and work, Pipes & cisterns and Time and distance .

Syllogism, Statement and course of action and Statement and Assumption.

Unit-V: Boats and streams, Areas, Volume and surface areas.

Statement and argument, Cause and effect and Drawing inference.

Text Books:

1. "Objective Arithmetic" by R.S. Agarwal, S. Chand Publications.
2. Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

Reference Books:

1. Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2. Quantitative Aptitude by Abhjit Guha.
3. Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

V Semester	L	T	P	C
	3	0	0	3

DESIGN THINKING AND PROJECT INNOVATION(18ME5T07)

(OPEN ELECTIVE-2)

Unit 1: An Insight into Design, History of Modern Design: Early Innovations Industrialization, New Materials, Nature of Design, Work Design for Survival and Survival through Design.

Unit 2: Design Thinking: Design Thinking as a systematic Approach to Innovation, Brainstorming, Visual Thinking, The Design Challenges, Product Development.

Unit 3: Innovation, Art of Innovation, Strategies for Creativity,Teams for Innovation, Design Alternatives, Decision Making for New Design.

Unit 4: Design Thinking for strategic Innovation, Application of Designs, Thinking In Business and Strategy,Linking Design Thinking Solution to Business Challenges, Enterprise Creativity Competitive Logic of business Strategy. Design Thinking for Startups.

Unit 5: Creative Thinking Techniques:Linear Thinking, Constraints in Design, Design Thinking to meetCorporate Needs, Designing today for tomorrow.

Reference Books:

1) David Raizman- History of Modern Design, Laurence King Publishing Ltd. Ed2 (2010)

2)Tim Brown, Change by Design, Harper Bollins (2009)

3)Tom Kelley with Jonathan Littman, Ten Faces of Innovation, Currency Books (2006)

4) Jimmy Jain, Design Thinking for startups, Notion Press (2018)

5)Tom Kelley & Jonathan Leman, The Art of Innovation, Harper Collins Business,(2001)

6) Michael Michalko,Thinker toys, Ten Speed Press (2006)

7)Idris Mootee, Design Thinking for Strategic Innovation John Willey & Sons (2013).

V Semester	L	T	P	C
	0	0	3	1.5

THEORY OF MACHINES LAB(18ME5L08)

1. To determine whirling speed of shaft theoretically and experimentally.
2. To determine the position of sleeve against controlling force and speed of a Hartnell governor and to plot the characteristic curve of radius of rotation.
3. To analyse the motion of a motorized gyroscope when the couple is applied along its spin axis
4. To determine the frequency of undamped free vibration of an equivalent spring mass system.
5. To determine the frequency of damped force vibration of a spring mass system
6. To study the static and dynamic balancing using rigid blocks.
7. To find the moment of inertia of a flywheel
8. To plot follower displacement vs cam rotation for various Cam Follower systems.
9. To plot slider displacement, velocity and acceleration against crank rotation for single slider crank mechanism/Four bar mechanism
10. To find coefficient of friction between belt and pulley.
11. To study simple and compound screw jack and determine the mechanical advantage , velocity ratio and efficiency
12. To study various types of gears- Spur, Helical, Worm and Bevel Gears

V Semester	L	T	P	C
	0	0	3	1.5

MACHINE TOOLS LAB (18ME5L09)

1. Demonstration of construction and operations of general purpose machines : Lathe, drilling machine, milling machine, shaper, slotting machine, cylindrical grinder and surface grinder.
2. Measure the characteristic features of lathe with simple step turning operation.
3. Job on step turning, taper turning, knurling, thread cutting on lathe machine.
4. Perform drilling, reaming and tapping operations.
5. Job on milling (Groove cutting/Gear cutting).
6. Job on shaping and planning.
7. Job on slotting.
8. Job on cylindrical and surface grinding.
9. Job on grinding of tool angles.

V Semester	L	T	P	C
	0	0	2	1

COMMUNICATION SKILLS LAB (18ME5L10)

1. Debate
2. Resume Preparation
3. JAM
4. Group Discussion
5. Interview Skills

Suggested Reading:

Interact- English Lab Manual for Undergraduate Students, Orient Blackswan 2016

V Semester	L	T	P	C
	2	0	0	0

ESSENCE OF INDIAN TRADITIONAL CULTURE(18ME5T11)

Unit-I:

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

Unit-II:

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Unit-III:

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Unit-IV:

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Unit-V:

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

E-Resources:

1. https://www.youtube.com/watch?v=LZP1StpYEPM 2.http://nptel.ac.in/courses/121106003/

VI

SEMESTER

SYLLABUS

VI Semester	L	T	P	C
	2	1	0	3

DESIGN OF TRANSMISSION ELEMENTS(18ME6T01)

UNIT – I

BEARINGS: Classification of bearings- applications, types of journal bearings – lubrication – bearing modulus – full and partial bearings – clearance ratio – heat dissipation of bearings, bearing materials – journal bearing design – ball and roller bearings – static loading of ball & roller bearings, bearing life.

UNIT – II

ENGINE PARTS: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – cranks and crank shafts, strength and proportions of over hung and center cranks – crank pins, crank shafts.Pistons, forces acting on piston – construction design and proportions of piston, cylinder, cylinder liners,

Design of curved beams: introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and t-section, design of crane hooks, c –clamps**.**

UNIT – III

POWER TRANSMISSIONS SYSTEMS, PULLEYS: Transmission of power by belt and rope drives , transmission efficiencies, belts – flat and v types – ropes - pulleys for belt and rope drives, materials, chain drives

DESIGN OF POWER SCREWS: Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw- possible failures.

UNIT – IV

SPUR & HELICAL GEAR DRIVES: Spur gears- helical gears – load concentration factor – dynamic load factor, surface compressive strength – bending strength – design analysis of spur gears – estimation of centre distance, module and face width, check for plastic deformation, check for dynamic and wear considerations.

UNIT – V

MACHINE TOOL ELEMENTS: Levers and brackets: design of levers – hand levers-foot lever – cranked lever

– lever of a lever loaded safety valve- rocker arm straight – angular- design of a crank pin – brackets- hangers- wall boxes.

Wire Ropes: Construction, Designation, Stresses in wire ropes, rope sheaves and drums

Note: Design data book is permitted for examination Text Books:

1. Machine Design/V.Bandari/TMH Publishers
2. Machine Design/ NC Pandya & CS Shaw/ Charotar publishers
3. Design data book.

References:

1. Machine Design: An integrated Approach / R.L. Norton / Pearson Education
2. Mech. Engg. Design / JE Shigley/Tata McGraw Hill education
3. Design of machine elements- spots/Pearson Publications
4. Machine Design-Norton/Pearson Publications

VI Semester	L	T	P	C
	2	1	0	3

HEAT TRANSFER(18ME6T02)

Unit I

Introduction: Basic modes of heat transfer- rate equations- generalized heat conduction equation - steady state heat conduction solution for plain and composite slabs - cylinders - critical thickness of insulation- heat conduction through fins of uniform cross section- fin effectiveness and efficiency.

Unsteady State Heat Transfer Conduction- Transient heat conduction- lumped system analysis and use of Heisler charts.

Unit II

Convection: Basic concepts of convection–heat transfer coefficients - types of convection –forced convection and free convection.

Forced convection in external flow–concepts of hydrodynamic and thermal boundary layer- use of empirical correlations for flow over plates and cylinders. Fluid friction – heat transfer analogy, approximate solution to laminar boundary layer equation for external flow. Internal flow – Use of empirical relations for convective heat transfer in horizontal pipe flow.

Free Convection -development of hydrodynamic and thermal boundary layer along a vertical plate – use of empirical relations for convective heat transfer on plates and cylinders in horizontal and vertical orientation

Unit III

Radiation: Radiation heat transfer – thermal radiation – laws of radiation - Black and Gray bodies – shape factor-radiation exchange between surfaces - Radiation shields - Greenhouse effect.

Unit IV

Heat Exchangers: Types of heat exchangers- parallel flow- counter flow- cross flow heat exchangers- overall heat transfer coefficient- LMTD and NTU methods- fouling in heat exchangers.

Unit V

Boiling and Condensation: Different regimes of boiling- nucleate, transition and film boiling – condensation - filmwise and dropwise condensation.

Mass Transfer: Conservation laws and constitutive equations - Fick's law of diffusion, isothermal equi-mass - Equimolal diffusion- - diffusion of gases and liquids- mass transfer coefficient.

Text Book(s)

1. P.K. Nag, Heat Transfer, 3/e, Tata McGraw-Hill, 2011.
2. F. P. Incropera and D.P. Dewitt, Fundamentals of Heat and Mass Transfer, 6/e, John Wiley, 2007.

References:

1. J.P.Holman, Heat Transfer, 9/e, Tata McGraw-Hill,2008.
2. Cengel. A.Yunus, Heat Transfer- A Practical Approach, 4/e, Tata McGraw-Hill, 2007.
3. S.P. Sukhatme, A Textbook of Heat Transfer, Universities Press, 2005
4. Lienhard and Lienhard, A Heat and Mass Transfer, Cambridge Press, 2011.
5. C.P. Kothandaraman and S. Subramanyan, Heat and Mass Transfer databook, New Age Publications, 2014

VI Semester	L	T	P	C
	3	0	3	3

METROLOGY AND MEASUREMENTS(18ME6T03)

UNIT I

Concept of Measurement: General concept-generalized measurement system, units and standards, measuring instruments, sensitivity, readability, range of accuracy, precision, static and dynamic response, repeatability, systematic and random errors, correction, calibration, terminology and limits fits and tolerances, hole basis and shaft basis system, interchangeability.

Linear and Angular Measurement: Linear measuring instruments: Vernier instruments, micrometers, slip gauges, tool makers microscope. Comparators: Mechanical, pneumatic and electrical. Angular measurements: Sine bar, bevel protractor and angle dekkor, rollers and spheres used to determine the tapers.

UNIT II

Flatness Measurement: Measurement of flatness – straight edges – surface plates, optical flat and autocollimators, interferometers and their applications.

Surface Roughness Measurement: Terminology systems, differences between surface roughness and surface waviness- Numerical assessment of surface finish - CLA, R,M,S Values-Ra , Rz values, Methods of measurement of surface finish-profilograph, talysurf, BIS symbols for indication of surface roughness, classification of automatic inspections systems, co-ordinate- measuring machines, non-contact inspection techniques-machine vision, laser scanning systems.

UNIT III

Metrology of Screw Threads:

Screw thread measurements: Elements of threads, errors in screw threads, various methods for measuring external and internal screw threads, screw thread gauges.

Gear Measurement: Gear tooth terminology, measurement of gear elements-runout, lead, pitch backlash, profile, pressure angle, tooth thickness, diameter of gear, constant chord and base tangent method.

UNIT IV

Measurement of Displacement: Theory and construction of various transducers to measure

displacement - Piezo electric, inductive, capacitance, resistance, ionization and photoelectric transducers, calibration procedures.

Measurement of Speed: Mechanical tachometers - Electrical tachometers - Stroboscope, Noncontact type of tachometer.

Measurements of Strain: Various types of electrical strain gauges, gauge factor, method of usage of resistance strain gauge for bending, compressive and tensile strains, usage for measuring torque, strain gauge rosettes.

UNIT V

Measurement of Force: Direct method - analytical balance, platform balance; elastic members – load cells, cantilever beams and proving rings.

Measurement of Torque: Torsion bar dynomometer, servo controlled dynamometer and absorption dynamometer.

Measurement of Temperature: Standards and calibration, thermal expansion methods, thermo electric sensors (thermocouples), Electrical Resistance sensors, Junction semiconductor sensors, Digital thermometers, Radiation methods.

Measurement of Pressure and Sound: Standards and calibration, basic methods of pressure measurement, dead weight gauges and manometers, Elastic transducers, vibrating cylinder, resonant transducers, High and low pressure measurement.

Textbooks:

1. Beckwith, Marangoni, Linehard, Mechanical Measurements, 6/e, PHI, 2013.
2. R.K. Jain, Engineering Metrology, 20/e, Khanna Publishers, 2013.

Reference Books:

1. Mahajan, Engineering Metrology, 2/e, Dhanpat Rai, 2013.
2. S.Bhaskar, Basic Principles - Measurments and Control Systems, Anuradha Publications, 2014.
3. Anand K Bewoor & Vinay A Kulkarni, Metrology & Measurement, 15/e, McGrawHill, 2015

VI Semester	L	T	P	C
	3	0	0	3

ROBOTICS(18ME6T04)

(OPEN ELECTIVE-3)

UNIT-I

INTRODUCTION: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – classification by coordinate system and control system.

COMPONENTS OF THE INDUSTRIAL ROBOTICS: Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors. Function line diagram representation of robot arms.

UNIT – II

MOTION ANALYSIS: Homogeneous transformations as applicable to rotation and translation – problems.

MANIPULATOR KINEMATICS: Specifications of matrices, D-H notation, joint coordinates and world coordinates. Forward and inverse kinematics – problems.

UNIT – III

Differential transformation and manipulators, Jacobians – problems.

Dynamics: Lagrange – Euler and Newton – Euler formulations – Problems.

UNIT IV

General considerations in path description and generation. Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion –straight line motion.

Robot programming, languages and software packages

UNIT V

ROBOT ACTUATORS AND FEED BACK COMPONENTS:

Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors.

Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors.

ROBOT APPLICATIONS IN MANUFACTURING: Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection. Future applications

Text Books:

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.

References:

1. Robotics / Fu K S/ McGraw Hill.
2. Robotic Engineering / Richard D. Klafter, Prentice Hall
3. Robot Analysis and Control / H. Asada and J.J.E. Slotine / BSP Books Pvt.Ltd.
4. Introduction to Robotics / John J Craig / Pearson Edu.

VI Semester	L	T	P	C
	3	0	0	3

RAPID PROTOTYPING(18ME6T05)

(OPEN ELECTIVE-3)

UNIT – I

Introduction**:** Introduction to Prototyping, Traditional Prototyping Vs. Rapid Prototyping (RP), Need for time compression in product development, Usage of RP parts, Generic RP process, Distinction between RP and CNC, other related technologies, Classification of RP.

RP Software**:** Need for RP software, MIMICS, Magics, SurgiGuide, 3-matic, 3D-Doctor, Simplant, Velocity2, VoXim, SolidView, 3DView, etc., software, Preparation of CAD models, Problems with STL files, STL file manipulation, RP data formats: SLC, CLI, RPI, LEAF, IGES, HP/GL, CT, STEP.

UNIT – II

Solid and Liquid Based RP Systems**:** Stereolithography (SLA): Principle, Process, Materials, Advantages, Limitations and Applications. Solid Ground Curing (SGC): Principle, Process, Materials, Advantages, Limitations, Applications. Fusion Deposition Modeling (FDM): Principle, Process, Materials, Advantages, Limitations, Applications. Laminated Object Manufacturing (LOM): Principle, Process, Materials, Advantages, Limitations, Applications.

UNIT – III

Powder Based RP Systems**:** Principle and Process of Selective Laser Sintering (SLS), Advantages, Limitations and Applications of SLS, Principle and Process of Laser Engineered Net Shaping (LENS), Advantages, Limitations and Applications of LENS, Principle and Process of Electron Beam Melting (EBM), Advantages, Limitations and Applications of EBM.

Other RP Systems: Three Dimensional Printing (3DP): Principle, Process, Advantages, Limitations and Applications. Ballastic Particle Manufacturing (BPM): Principle, Process, Advantages, Limitations, Applications. Shape Deposition Manufacturing (SDM): Principle, Process, Advantages, Limitations, Applications.

UNIT – IV

Rapid Tooling: Conventional Tooling Vs. Rapid Tooling, Classification of Rapid Tooling, Direct and Indirect Tooling Methods, Soft and Hard Tooling methods.

Reverse Engineering (RE): Meaning, Use, RE – The Generic Process, Phases of RE Scanning, Contact

Scanners and Noncontact Scanners, Point Processing, Application Geometric Model, Development.

UNIT – V

Errors in RP Processes: Pre-processing, processing, post-processing errors, Part building errors in SLA, SLS, etc.

RP Applications: Design, Engineering Analysis and planning applications, Rapid Tooling, Reverse Engineering, Medical Applications of RP.

Text Books:

1. Chua C.K., Leong K.F. and Lim C.S., Rapid Prototyping: Principles and Applications, 2/e Edition, World Scientific Publishers, 2003.
2. Ian Gibson, David W. Rosen, Brent Stucker, Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, 1st Edition, Springer, 2010.
3. Rafiq Noorani, Rapid Prototyping: Principles and Applications in Manufacturing, John Wiley & Sons, 2006.
4.

Reference Books:

1. Liou W. Liou, Frank W., Liou, Rapid Prototyping and Engineering Applications: A Tool Box for Prototype Development, CRC Press, 2007.
2. Pham D.T. and Dimov S.S., Rapid Manufacturing; The Technologies and Application of RPT and Rapid tooling, Springer, London 2001.
3. Gebhardt A., Rapid prototyping, Hanser Gardener Publications, 2003.
4. Hilton P.D. and Jacobs P.F., Rapid Tooling: Technologies and Industrial Applications,

VI Semester	L	T	P	C
	3	0	0	3

GREEN ENGINEERING SYSTEMS(18ME6T06)
(OPEN ELECTIVE-3)

UNIT - I

INTRODUCTION:

Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT - II

Solar Energy Storage and Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling techniques, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria, types of winds, wind data measurement.

UNIT - III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio-fuels, I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants.

Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT - IV

Energy Efficient Systems:

Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating,

ventilation and air conditioning), demand site management.

Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, environmental friendly and energy efficient compressors and pumps.

UNIT - V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

TEXT BOOKS:

1. Sukhatme S.P., & Nayak J. K., Solar Energy – Principles of Thermal Collection and Storage, TMH, 2008.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Davim J. P., Green Manufacturing Processes and Systems, Springer, 2013.

REFERENCE BOOKS:

1. Jagadeesh K. S., Venkata Rama Reddy B. V., & Nanjunda Rao, K. S., Alternative Building Materials and Technologies, New Age International (P) Ltd., 2014
2. Goswami Y. D., Krieth F., & John F Kreider, Principles of Solar Engineering, CRC Press (Taylor & Francis), 2015
3. Desai A. V., Non-Conventional Energy, New Age International (P) Ltd.
4. Ramesh & Kumar, Renewable Energy Technologies, Narosa Publishing House, 1997.
5. Rai G. D., Non-conventional Energy Source, Standard Publishers, 2009.
6. Twidell J., & Weir T., Renewable Energy Resources, 2nd Edition, BSP Books Pvt. Ltd, 2006.
7. Hoogers G., Fuel Cell Technology–Hand Book, CRC Press (Taylor & Francis), 2019.

VI Semester	L	T	P	C
	3	0	0	3

ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS(18ME6T07)

(OPEN ELECTIVE-4)

UNIT-I

Introduction : AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT–II

Searching : Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT–III

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in proposional logic, Resolution, Forward & Backward Chaining. First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT–IV

Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

UNIT–V

Feed forward Neural Networks:

Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks. Feedback Neural Networks:

Introduction, Analysis of Linear Auto associative FF Networks, Analysis of Pattern Storage Networks.

TEXT BOOKS :

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.

2. Artificial Neural Networks B. Yagna Narayana, PHI

REFERENCES :

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).

2. Artificial Intelligence and Expert Systems – Patterson PHI.

3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.

4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.

5.Neural Networks Simon Haykin PHI

6. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

VI Semester	L	T	P	C
	3	0	0	3

NANO TECHNOLOGY(18ME6T08)

(OPEN ELECTIVE-4)

UNIT I

Introduction to Nano technology:

Introduction: History and Scope, Can Small Things Make a Big Difference? Classification of Nanostructured Materials, Fascinating Nanostructures, Applications of Nanomaterials, Nature: The Best of Nanotechnologist, Challenges, and Future Prospects.

UNIT – II Properties of Nano Materials

Unique Properties of Nanomaterials: Microstructure and Defects in nanocrystalline Materials: Dislocations, Twins, stacking faults and voids, Grain Boundaries, triple, and disclinations, Effect of Nano-dimensions on Materials Behavior: Elastic properties, Melting Point, Diffusivity, Grain growth characteristics, enhanced solid solubility, Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT – III Processing of nano materials

Synthesis Routes : Bottom up approaches: Physical Vapor Deposition, Inert Gas Condensation, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method ,Self assembly, Top down approaches: Mechanical alloying, Nano-lithography, Consolidation of Nanopowders: Shock wave consolidation, Hot isostatic pressing and Cold isostatic pressing Spark plasma sintering.

UNIT-IV Nanomaterials for Energy Conversion Systems

Issues and Challenges of functional Nanostructured Materials for electrochemical Energy, Conversion Systems, Fuel Cells, Principles and nanomaterials design for Proton exchange membrane fuel cells (PEMFC); Direct methanol fuel cells (DMFC).

UNIT-V Nanomaterials for Energy Storage

Issues and Challenges of functional Nanostructured Materials for electrochemical Energy Storage Systems, Primary and Secondary Batteries (Lithium ion Batteries), Cathode and anode materials, Nanostructured Carbon based materials, Nano-Oxides, Novel hybrid electrode materials, Current status and future trends.

TEXTBOOK

1. Electrochemical methods: Fundamentals and Applications, Allen J.Bard and Larry R. Faulkner, 2nd Edition John Wiley & Sons. Inc (2004)

2. D. Linden Ed., Handbook of Batteries, 2nd edition, McGraw-Hill, New York (1995)

3. G.A. Nazri and G. Pistoia, Lithium Batteries: Science and Technology, Kulwer Acdemic Publishers, Dordrecht, Netherlands (2004).

4. J. Larmine and A. Dicks, Fuel Cell System Explained, John Wiley, New York (2000).

REFERENCE BOOK

1. Science and Technology of Lithium Batteries-Materials Aspects: An Overview, A. Manthiram, Kulwer Academic Publisher (2000).

2. M. S. Whittingham, A. J. Jacobson, Intercalation Chemistry, Academic Press, New York (1982).

3. M. Wakihara, O. Yamamoto, (Eds.) Lithium Ion Batteries: Fundamentals and Performance, Wiley – VCH , Weinheim (1998).

VI Semester	L	T	P	C
	3	0	0	3

EMPLOYABILITY SKILLS-2 (18ME6T09)

(OPEN ELECTIVE-4)

Unit-1 What Is A Program?

Introduction, Processing, System, Block diagram of a computer, Peripheral Devices, Booting, Flowcharts, Algorithms, Multi Processing, Multi Threading,.

Unit-2. The Problem Domain

Introduction , System Software, Networking and Web Applications Software, Embedded Software, Reservation Software, Business Software, Entertainment Software, Artificial Intelligence Software, Scientific Software, Utilities Software, Document Management Software

Unit-3. Storing Information

Introduction, Need for storing, File System, DBMS, Advantages and Disadvantages, Permissions, DDL and DML Commands.

Unit-4. Logic And Errors

Introduction, Decision Making Capacity, Business Logic, Application Logic, Error handling, Recoverable and non-recoverable errors, Damage Control.

Unit-5. Proving Programs With Tests

Introduction, Purpose of Testing, Flow Graphs and Path Testing, Transaction Flow Testing, Domain Testing, Manual and Automated Testing.

VI Semester	L	T	P	C
	0	0	3	1.5

METROLOGY AND INSTRUMENTATION LAB(18ME6L10)

LIST OF EXPERIMENTS

- Use of gear teeth Vernier calipers and checking the chordal addendum and chordal height of spur gear.
- Alignment test on the lathe and milling machine using dial indicators
- Study of Tool makers microscope and its application
- Angle and taper measurements by Bevel protractor, Sine bars.
- Use of spirit levels in finding the flatness of the surface plate.
- Surface roughness measurement by Talysurf instrument.
- Calibration of Strain Gauge for load measurement.
- Study and calibration of rotameter for flow pressure.
- Calibration of transducer or thermocouple for temperature measurement.
- Calibration of LVDT transducer for displacement measurement.
- Calibration of capacitive transducer for angular measurement.
- Calibration of photo and magnetic speed pickups for the measurement of speed.

VI Semester	L	T	P	C
	0	0	3	1.5

HEAT TRANSFER LAB(18ME6L11)

List of Experiments

1. Determine the overall heat transfer coefficient across the width of composite wall
2. Determine the thermal conductivity of a metal rod
3. Determine the thermal conductivity of insulating powder material through concentric sphere apparatus
4. Determine the thermal conductivity of insulating material through lagged pipe apparatus
5. Determine the efficiency of a pin fin in natural and forced convection.
6. Determine the heat transfer coefficient for a vertical cylinder in natural convection
7. Determine the heat transfer coefficient in forced convection of air in a horizontal tube.
8. Determine the heat transfer coefficients on film and drop wise condensation apparatus.
9. Determine the effectiveness of a parallel and counter flow heat exchanger.
10. Study the pool boiling phenomenon and different regimes of pool boiling.
11. Experiment on pool boiling
12. Determine the emissivity of the test plate surface.
13. Experiment on Stefan-Boltzmann apparatus
14. Determine the heat transfer rate coefficient in fluidized bed apparatus

VI Semester	L	T	P	C
	2	0	0	0

DISASTER MANAGEMENT(18ME6T12)

UNIT-I :

Natural Hazards And Disaster Management:Introduction of DM – Inter disciplinary -nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides.

UNIT-II :

Man Made Disaster And Their Management Along With Case Study Methods Of The Following: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrorism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management. Impact of disaster on poverty and deprivation- Climate change adaptation and human health -Exposure , health hazards and environmental risk-Forest management and disaster risk reduction

UNIT-III :

Risk And Vulnerability: Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.

UNIT-IV :

Role Of Technology In Disaster Managements:Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training- transformable indigenous knowledge in disaster reduction.

UNIT-V :

Education And Community Preparedness:Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action.

TEXT BOOKS

- 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy(2009),Universities press.
- 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
- 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt. Ltd.

REFERENCE BOOKS

- 'Disaster Management' edited by H K Gupta (2003),Universities press.

VI Semester	L	T	P	C
	2	0	0	0

SUMMER INTERNSHIP (18ME6I13)

VII

SEMESTER

SYLLABUS

VII Semester	L	T	P	C
	3	0	0	3

CAD/CAM(18ME7T01)

UNIT I

CAD/CAM: Introduction, hardware and software, I/O devices, benefits. graphics standards-Neutral file formats – IGES, STEP.

2D and 3D geometric transformations: Translation, scaling, rotation, mirroring, homogenous transformations, concatenation of transformations, viewing transformations.

UNIT II:

Geometric Modelling:

Parametric representation: Representation of curves, Hermite curves, Spline, Bezier and B-spline curves in two dimensions; Geometric modelling of surfaces: Surface patch, Coons and bicubic patches, Bezier and B-spline surfaces, sweep surfaces, surface of revolution, blending of surfaces;

Geometric Modelling of Solids: Wireframe, surface modelling, solid entities, boolean operations, CSG approach and B-rep of solid modelling, geometric modelling of surfaces.

UNIT III

Computer Aided Manufacturing (CAM): Structure of numerical control (NC) machine tools, designation of axes, drives and actuation systems, feedback devices, computer numerical control (CNC) and direct numerical control (DNC), adaptive control system, CNC tooling, automatic tool changers and work holding devices, functions of CNC and DNC systems.

UNIT IV

Part Programming: Part programming instruction formats, information codes, preparatory functions, miscellaneous functions (G-codes, M-codes). Tool codes and tool length offset, interpolations canned cycles.

APT Programming: APT language structure, APT geometry, Definition of point, line, circle, plane.

APT Motion Commands: set-up commands, pint to point motion commands; continuous path motion commands part programming preparation for typical examples (milling and turning operation)

UNIT V

Automation: Anatomy and configuration of robot, characteristics of robots, grippers, application of robots in manufacturing, robot programming languages. Computer integrated manufacturing (CIM): Elements of

CIM, Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI) and expert systems in CIM.

Text books:

1. P. N. Rao, CAD/CAM: Principles and applications, 3/e, Tata McGraw-Hill, Delhi, 2017
2. Ibrahim Zeid, R.Siva Subramanian, CAD/CAM: Theory and Practice, 2/e, Tata McGraw-Hill, Delhi, 2009

Reference books:

1. Mikell P. Groover, Emory W. Zimmers , CAD/CAM, 5/e, Pearson Prentice Hall of India, Delhi, 2008
2. P. Radhakrishnan, S. Subramanyan & V. Raju, CAD/CAM/CIM, 3/e, New Age International Publishers, 2008
3. Computer Aided Manufacturing, 3/e, Tien Chien Chang, Pearson, 2008

VII Semester	L	T	P	C
	3	0	0	3

OPERATIONAL RESEARCH(18ME7T02)

UNIT – I

Development – definition– characteristics and phases – types of operation research models –applications.

ALLOCATION: Linear programming problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle.

UNIT – II

TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem – degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem-traveling salesman problem.

SEQUENCING – Introduction – flow –shop sequencing – *n* jobs through two machines – *n* jobs through three machines – job shop sequencing – two jobs through 'm' machines.

UNIT – III

REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement.

UNIT – IV

THEORY OF GAMES: Introduction – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

WAITING LINES: Introduction – single channel – poison arrivals – exponential service times – with infinite population and finite population models– multichannel – poison arrivals – exponential service times with infinite population single channel poison arrivals.

SIMULATION: Definition – types of simulation models – phases of simulation– applications of simulation – inventory and queuing problems – advantages and disadvantages – simulation languages.

UNIT – V

INVENTORY : Introduction – single item – deterministic models – purchase inventory models with one price break and multiple price breaks – shortages are not allowed – stochastic models – demand may be discrete variable or continuous variable – instantaneous production. Instantaneous demand and continuous demand and no set up cost. ABC & VED Analysis.

DYNAMIC PROGRAMMING: Introduction – Bellman's principle of optimality – applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

TEXT BOOKS:

• Operations Research-An Introduction/Hamdy A Taha/Pearson publishers

• Operations Research –Theory & publications / S.D.Sharma-Kedarnath/McMillan publishers India Ltd

REFERENCES:

- Introduction to O.R/Hiller & Libermann/TMH
- Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
- Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman/Wiley
- Operations Research / R.Pannerselvam/ PHI Publications.
- Operations Research / Wagner/ PHI Publications.
- Operation Research /J.K.Sharma/MacMilan Publ.
- Operations Research/ Pai/ Oxford Publications
- Operations Research/S Kalavathy / Vikas Publishers
- Operations Research / DS Cheema/University Science Press
- Operations Research / Ravindran, Philips, Solberg / Wiley publishers

VII Semester	L	T	P	C
	3	0	0	3

FINITE ELEMENT METHODS(18ME7T03)

(PROFESSIONAL ELECTIVE -1)

UNIT - I

Introduction to finite element methods for solving field problems, Stress and equilibrium, Boundary conditions, Strain-Displacement relations, Stress- strain relations for 2D and 3D Elastic problems. Potential energy and equilibrium, The Rayleigh-Ritz method, Formulation of Finite Element Equations.

One dimensional problems: Finite element modeling coordinates and shape functions. Assembly of global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions, Quadratic shape functions.

UNIT - II

Analysis of trusses: Stiffness Matrix for plane truss element. Stress Calculations and Problems.

Analysis of beams: Element Stiffness Matrix for two noded, two degrees of freedom per node beam element and simple problems.

UNIT - III

Finite element modeling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions. Estimation of load Vector, Stresses.Finite element modeling of Axi-symmetric solids subjected to axi-symmetric loading with triangular elements.Two dimensional four nodedIsoparametric elements and problems.

UNIT - IV

Steady state heat transfer analysis: One dimensional analysis of slab and fin, two dimensional analysis of thin plate. Analysis of a uniform shaft subjected to torsion

UNIT V

Dynamic analysis: Formulation of finite element model,element –mass matrices,evaluation of Eigen values and Eigen vectors for a stepped bar truss.

3D Problems: Finite Elementformulation for stress analysis, Convergence requirements, mesh generation, techniques such as semi automatic and fully automatic use of software’s such as ANSYS,NISA,NASTRAN.

TEXT BOOKS

1. Chandraputla, Ashok &Belegundu,Introduction to Finite Element in Engineering, Prentice Hall.
2. S.S.Rao, The Finite Element Methods in Engineering,Elsevier Butterworth -Heinemann 2nd Edition, 2011.

REFERENCE BOOKS

1. J N Reddy, An introduction to the Finite Element Method, McGraw – Hill, New York, 1993.
1. R D Cook, D S Malkus and M E Plesha, Concepts and Applications of Finite Element Analysis, 3rd Edition, John Wiley, New York, 1989.
2. K J Bathe, Finite Element Procedures in Engineering Analysis, Prentice-Hall, Englewood Cliffs,1982.
3. T J R Hughes, the Finite Element Method, Prentice-Hall, Englewood Cliffs, NJ, 1986.
4. O C Zienkiewicz and R L Taylor, the Finite Element Method, 3rd Edition. McGraw-Hill, 1989.

VII Semester	L	T	P	C
	3	0	0	3

GAS DYNAMICS AND JET PROPULSION(18ME7T04)

PROFESSIONAL ELECTIVE -1

UNIT - I

Introduction to Gas Dynamics: control volume and system approaches acoustic waves and sonic velocity - Mach number - classification of fluid flow based on Mach number - Mach cone-compressibility factor - general features of one dimensional flow of a compressible fluid - continuity and momentum equations for a control volume.

UNIT - II

Isentropic Flow of an Ideal Gas: basic equation - stagnation enthalpy, temperature, pressure and density-stagnation, acoustic speed - critical speed of sound- dimensionless velocity-governing equations for isentropic flow of a perfect gas - critical flow area - stream thrust and impulse function.

Steady one dimensional isentropic flow with area change-effect of area change on flow parameters-chocking- convergent nozzle - performance of a nozzle under decreasing back pressure –De-lavel nozzle - optimum area ratio effect of back pressure - nozzle discharge coefficients - nozzle efficiencies.

UNIT - III

Simple Frictional Flow: adiabatic flow with friction in a constant area duct-governing equations - fanno line limiting conditions - effect of wall friction on flow properties in an Isothermal flow with friction in a constant area duct-governing equations - limiting conditions.

Steady one dimensional flow with heat transfer in constant area ducts- governing equations - Rayleigh line entropy change caused by heat transfer - conditions of maximum enthalpy and entropy.

UNIT - IV

Effect of Heat Transfer on Flow Parameters: Intersection of Fanno and Rayleigh lines. Shock waves in perfect gas- properties of flow across a normal shock - governing equations - Rankine Hugoniat equations - Prandtl's velocity relationship - converging diverging nozzle flow with shock thickness - shock strength.

UNIT - V

Propulsion: Air craft propulsion: - types of jet engines - energy flow through jet engines, thrust, thrust power and propulsive efficiency turbojet components-diffuser, compressor, combustion chamber, turbines,

exhaust systems. Performance of turbo propeller engines, ramjet and pulsejet, scramjet engines. Rocket propulsion

- rocket engines, Basic theory of equations - thrust equation - effective jet velocity - specific impulse - rocket engine performance - solid and liquid propellant rockets - comparison of various propulsion systems.

TEXT BOOKS:

1 Compressible fluid flow /A. H. Shapiro / Ronald Press Co., 1953
2 Fundamentals of compressible flow with aircraft and rocket propulsion/S. M. Yahya/New Age international Publishers, 2003
3 Fundamental of Gas dynamics-2nd edition/ M J Zucker/ Wiley publishers, 2002

REFERENCES:

1 Elements of gas dynamics / HW Liepman & A Roshko/Wiley, 1957
2 Aircraft & Missile propulsion /MJ Zucrow/Wiley, 1958
3 Gas dynamics / M.J. Zucrow & Joe D.Holfman / Krieger Publishers, 1976.

VII Semester	L	T	P	C
	3	0	0	3

PRODUCTION PLANNING AND CONTROL(18ME7T05)

PROFESSIONAL ELECTIVE -1

UNIT – I

Introduction : Definition – Objectives of production Planning and Control – Functions of production planning and control – Elements of production control – Types of production – Organization of production planning and control department – Internal organization of department.

UNIT – II

Forecasting – Importance of forecasting – Types of forecasting, their uses – General principles of forecasting – Forecasting techniques – qualitative methods and quantitative methods.

UNIT – III

Inventory management – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P–Systems and Q-Systems. Introduction to MRP I,MRP II & ERP, LOB (Line of Balance), JIT and CANBAN system.

UNIT –IV

Routing – Definition – Routing procedure –Route sheets – Bill of material – Factors affecting routing procedure. Schedule –definition – Difference with loading

UNIT – V

Scheduling Policies – Techniques, Standard scheduling methods, line balancing, Aggregate planning, Expediting, controlling aspects.

Dispatching – Activities of dispatcher – Dispatching procedure – follow up – definition – Reason for existence of functions – types of follow up.

TEXT BOOKS :

1. Elements of Production Planning and Control / Samuel Eilon.
2. Manufacturing,Planning and Control, Partik Jonsson Stig-Arne Mattsson, Tata Mc Graw Hill.

REFERENCES :

1. Operations Management – S.N. Chary.

2. Inventory Control Theory and Practice / Martin K. Starr and David W. Miller.

3. Reliability Engineering & Quality Engineering by Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy, Galgotia Publications, Pvt., Limited.

4. Production Control A Quantitative Approach / John E. Biegel.

5. Production Control / Moore.

VII Semester	L	T	P	C
	3	0	0	3

ADVANCED MATERIALS(18ME7T06)

PROFESSIONAL ELECTIVE -2

UNIT-I

INTRODUCTION TO COMPOSITE MATERIALS:

Introduction, classification: polymer matrix composites, metal matrix composites, ceramic matrix composites, carbon–carbon composites, fiber reinforced composites and nature-made composites, and applications and Reinforcements**:** Fibres- glass, silica, kevlar, carbon, boron, silicon carbide, and boron carbide fibres.

UNIT-II POLYMERS

Introduction to Polymer composites, thermoplastics, thermosetting plastics, manufacturing of PMC, MMC & CCC and their applications. Miscellaneous manufacturing methods: Autoclave, tape production, moulding methods and hand layup.

UNIT-III

MACROMECHANICAL ANALYSIS OF A LAMINA: Introduction, generalized Hooke's law, reduction of Hooke's law in three dimensions to two dimensions, relationship of compliance and stiffness matrix to engineering elastic constants of an orthotropic lamina, laminate-laminate code.

UNIT-IV

FUNCTIONALLY GRADED MATERIALS: Types of functionally graded materials-classification different systems-preparation-properties and applications of functionally graded materials.

SHAPE MEMORY ALLOYS: Introduction-shape memory effect-classification of shape memory alloys composition-properties and applications of shape memory alloys.

UNIT-V

NANO MATERIALS:

Introduction-properties at nano scales-advantages & disadvantages-applications in comparison with bulk materials (nano – structure, wires, tubes, composites). state of art nano advanced- topic delivered by student.

Text Books:

1. Nano material /A.K. Bandyopadyay/New age Publishers
2. Material science and Technology: A comprehensive treatment/Robert W.Cahn,/VCH
3. Engineering Mechanics of Composite Materials / Isaac and M Daniel/Oxford University Press

References:

1. Mechanics of Composite Materials / R. M. Jones/ Mc Graw Hill Company, New York, 1975.
2. Analysis of Laminated Composite Structures / L. R. Calcote/Van Nostrand Rainfold,NY 1969
3. Analysis and performance of fibre Composites /B. D. Agarwal and L. J. Broutman /Wiley-Interscience, New York, 1980
4. Mechanics of Composite Materials - Second Edition (Mechanical Engineering) /Autar K.Kaw / CRC Press

VII Semester	L	T	P	C
	3	0	0	3

POWER PLANT ENGINEERING(18ME7T07)

PROFESSIONAL ELECTIVE -2

UNIT – I

Introduction to the Sources of Energy: Resources and Development of Power in India. Layouts of Steam, Hydel, Diesel, MHD, Nuclear and Gas Turbine Power Plants - Combined Power Cycles - Comparison and Selection.

Power Plant Economics and Environmental Considerations: Capital Cost, Investment of Fixed Charges, Operating Costs, General Arrangement of Power Distribution, Load Curves, Load Duration Curve. Definitions of Connected Load, Maximum Demand, Demand Factor, Average Load, Load Factor, Diversity Factor - Tariff - Related Exercises. Effluents from Power Plants and Impact on Environment - Pollutants and Pollution Standards - Methods of Pollution Control. Inspection and Safety Regulations.

UNIT – II

Steam Power Plant: Modern High Pressure and Supercritical Boilers - Analysis of Power Plant Cycles - Modern Trends in Cycle Improvement - Waste Heat Recovery, Fluidized Bed Boilers., Fuel and Handling Equipment's, Types of Coals, Coal Handling, Choice of Handling Equipment, Coal Storage, Ash Handling Systems.

Steam Power Plant Combustion Process: Properties of Coal - Overfeed and Under Feed Fuel Beds, Travelling Grate Stokers, Spreader Stokers, Retort Stokers, Pulverized Fuel Burning System And Its Components, Combustion Needs and Draught System, Cyclone Furnace, Design and Construction, Dust Collectors, Cooling Towers And Heat Rejection. Analysis of Pollution from Thermal Power Plants - Pollution Controls.CO2 Recorders

UNIT – III

Diesel Power Plant: Diesel Power Plant: Introduction - IC Engines, Types, Construction- Plant Layout with Auxiliaries - Fuel Storage

Gas Turbine Plant: Introduction - Classification - Construction - Layout with Auxiliaries - Principles of Working Closed and Open Cycle Gas Turbines. Advantages And Disadvantages Combined Cycle Power Plants.

UNIT – IV

Hydro Electric Power Plant: Water Power - Hydrological Cycle / Flow Measurement - Drainage Area

Characteristics - Hydrographs - Storage and Pondage - Classification of Dams and Spill Ways.

Hydro Projects and Plant: Classification - Typical Layouts - Plant Auxiliaries - Plant Operation Pumped Storage Plants.

UNIT – V

Power from Non-Conventional Sources: Utilization of Solar Collectors- Principle of its Working, Wind Energy - Types of Turbines - HAWT & VAWT-Tidal Energy. MHD power Generation.

Nuclear Power Station: Nuclear Fuel - Nuclear Fission, Chain Reaction, Breeding and Fertile Materials - Nuclear Reactor -Reactor Operation.

Types of Reactors: Pressurized Water Reactor, Boiling Water Reactor, Sodium-Graphite Reactor, Fast breeder Reactor, Homogeneous Reactor, Gas Cooled Reactor, Radiation Hazards and Shielding - Radioactive Waste Disposal.

TEXT BOOKS:

1. P.K. Nag, Power Plant Engineering, 3/e, TMH, 2013.
2. Arora and S. Domkundwar, A course in Power Plant Engineering, Dhanpat Rai & Co (P) Ltd, 2014

REFERENCE BOOKS:

1. Rajput, A Text Book of Power Plant Engineering, 4/e, Laxmi Publications, 2012.
2. Ramalingam, Power plant Engineering, Scietech Publishers, 2013
3. P.C. Sharma, Power Plant Engineering, S.K. Kataria Publications, 2012.

VII Semester	L	T	P	C
	3	0	0	3

OPTIMIZATION TECHNIQUES THROUGH MATLAB(18ME7T08)

PROFESSIONAL ELECTIVE -2

UNIT – I

Introduction to MAT LAB: Overview, MATLAB Preliminaries, Basics of MATLAB, Beyond the Basics of MATLAB, Popular Functions and Commands, Plotting using MATLAB, Optimization with MATLAB.

UNIT – II

Introduction to Optimization: Statement of an optimization problem, Classifications of optimization Problems: Single variable optimization, Multi variable optimization with no constraints, Multi variable optimization with equality constraints, Multi variable optimization with inequality constraints, Convex and Concave programming.

UNIT – III

Single Variable Optimization: Finite difference method, Central difference method, Runge-Kutta method, interval halving method, golden section method with MATLAB code.

UNIT – IV

Multi Variable Optimization: Conjugate gradient method, Newton's method, Powell's method, Flectcher-Reeves method, Hook and Jeeves method, interior penalty function with MATLAB code.

UNIT – V

Evolutionary Algorithms: Overview, Genetic Algorithms: Basics of Genetic Algorithms, Options in MATLAB, Multi Objective Optimization using Genetic Algorithms, Ant Colony Optimization, Simulated Annealing, Particle Swarm Optimization.

TEXT BOOKS:

1. Rao V.Dukkipati, MATLAB: An Introduction with Applications, Anshan, 2010.
2. Achille Messac, Optimization in practice with MATLAB, Cambridge University Press, 2015.
3. Jasbir S Arora, Introduction to optimum design, 2/e. Elsevier, 2004.

REFERENCES:

1. Cesar Perez Lopez, MATLAB Optimization Techniques, Academic press, Springer publications, 2014.
2. Steven C.Chapra, Applied Numerical Methods with MATLAB for Engineers and scientists, 4/e, McGraw-Hill Education, 2018.

VII Semester	L	T	P	C
	3	0	0	3

MECHATRONICS(18ME7T09)

OPEN ELECTIVE-5

UNIT – I

Introduction: Definition of Mechatronics, Need for Mechatronics in Industry, Objectives of mechatronics, mechatronics design process, Mechatronics key elements, mechatronics applications – Computer numerical control (CNC) machines, Tool monitoring systems, Flexible manufacturing system (FMS), Industrial Robots, Automatic packaging systems, Automatic inspection systems.

UNIT – II

Sensors: Static characteristics of sensors, Displacement, Position and Proximity sensors, Force and torque sensors, Pressure sensors, Flow sensors, Temperature sensors, Acceleration sensors, Level sensors, Light sensors, Smart material sensors, Micro and Nano sensors, Selection criteria for sensors.

UNIT – III

Actuators: Mechanical, Electrical, Hydraulic and Pneumatic Actuation systems, Characteristics and their limitations, Design of Hydraulic and Pneumatic circuits, Piezoelectric actuators, Shape memory alloys, Selection criteria for actuators.

UNIT – IV

Microprocessors, Microcontrollers and Programmable Logic Controllers: Architecture of Microprocessor, Microcontroller and Programmable Logic Controller, PLC Programming using ladder diagrams, logics, latching, sequencing, timers relays and counters, data handling, Analog input/output, selection of controllers.

UNIT – V

Micro Electro Mechanical Systems (MEMS): History, Effect of scaling, Fabrication Techniques: Oxidation, Physical Vapor disposition, Chemical Vapor Deposition, Lithography, Etching, Wafer bonding, LIGA, DRIE, Applications: Lab on chip.

Text books:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering , WBolton, 3/e Pearson Education Press, 2005.

2.Devadas Shetty and Richard A Kolk, Mechatronic System Design, 2/e, Cengage learning, 2010.

3. Clarence W. de Silva, Mechatronics an Integrated Approach, CRC Press, 2004.

4. James J Allen, Micro Electro Mechanical Systems Design, CRC Press Taylor & Francis group, 2005.

5. Ganesh S Hedge, Mechatronics, Jones & Bartlett Learning, 2010.

VII Semester	L	T	P	C
	3	0	0	3

MICRO-ELECTRO-MECHANICAL SYSTEMS(18ME7T10)

OPEN ELECTIVE-5

UNIT – I :

INTRODUCTION: Definition of MEMS, MEMS history and development, micro machining, lithography principles & methods, structural and sacrificial materials, thin film deposition, impurity doping, etching, surface micro machining, wafer bonding, LIGA.

MECHANICAL SENSORS AND ACTUATORS: Principles of sensing and actuation: beam and cantilever, capacitive, piezo electric, strain, pressure, flow, pressure measurement by micro phone, MEMS gyroscopes, shear mode piezo actuator, gripping piezo actuator, Inchworm technology.

UNIT – II :

THERMAL SENSORS AND ACTUATORS: Thermal energy basics and heat transfer processes, thermisters, thermo devices, thermo couple, micro machined thermo couple probe, peltier effect heat pumps, thermal flow sensors, micro hot plate gas sensors, MEMS thermo vessels, pyro electricity, shape memory alloys (SMA), U-shaped horizontal and vertical electro thermal actuator, thermally activated MEMS relay, micro spring thermal actuator, data storage cantilever.

UNIT – III:

MICRO-OPTO-ELECTRO MECHANICAL SYSTEMS: Principle of MOEMS technology, properties of light, light modulators, beam splitter, micro lens, micro mirrors, digital micro mirror device (DMD), light detectors, grating light valve (GLV), optical switch, wave guide and tuning, shear stress measurement.

MAGNETIC SENSORS AND ACTUATORS: Magnetic materials for MEMS and properties, magnetic sensing and detection, magneto resistive sensor, more on hall effect, magneto diodes, magneto transistor, MEMS magnetic sensor, pressure sensor utilizing MOKE, mag MEMS actuators, by directional micro actuator, feedback circuit integrated magnetic actuator, large force reluctance actuator, magnetic probe based storage device.

UNIT – IV :

MICRO FLUIDIC SYSTEMS: Applications, considerations on micro scale fluid, fluid actuation methods, dielectro phoresis (DEP), electro wetting, electro thermal flow, thermo capillary effect, electro osmosis flow, opto electro wetting (OEW), tuning using micro fluidics, typical micro fluidic channel,

microfluid dispenser, micro needle, molecular gate, micro pumps.

RADIO FREQUENCY (RF) MEMS:RF – based communication systems, RF MEMS, MEMS inductors, varactors, tuner/filter, resonator, clarification of tuner, filter, resonator, MEMS switches, phase shifter.

UNIT – V :

CHEMICAL AND BIO MEDICAL MICRO SYSTEMS: Sensing mechanism & principle, membrane-transducer materials, chem.-lab-on-a-chip (CLOC) chemoresistors, chemocapacitors, chemotransistors, electronic nose (E-nose), mass sensitive chemosensors, fluroscence detection, calorimetric spectroscopy.

TEXT BOOK

- MEMS, Nitaigour Premchand Mahalik, TMH Publishing co.

REFERENCE BOOKS

- Foundation of MEMS, Chang Liu, Prentice Hall Ltd.
- MEMS and NEMS, Sergey Edwrd Lyshevski, CRC Press, Indian Edition.
- MEMS and Micro Systems: Design and Manufacture, Tai-Ran Hsu, TMH Publishers.
- Introductory MEMS, Thomas M Adams, Richard A Layton, Springer International Publishers.

VII Semester	L	T	P	C
	3	0	0	3

SOLAR ENERGY SYSTEMS(18ME7T10)

OPEN ELECTIVE-5

UNIT – I

Solar Radiation and Collectors: Solar angles – Sun path diagrams – Radiation - extra-terrestrial characteristics - measurement and estimation on horizontal and tilted surfaces - flat plate collector thermal analysis - testing methods-evacuated tubular collectors - concentrator collectors – classification - design and performance parameters - tracking systems - compound parabolic concentrators - parabolic trough concentrators - concentrators with point focus - Heliostats – performance of the collectors.

UNIT – II

Solar Thermal Technologies: Principle of working, types, design and operation of - Solar heating and cooling systems - Thermal Energy storage systems – Solar Desalination – Solar cooker : domestic, community – Solar pond – Solar drying.

UNIT – III

Solar PV Fundamentals: Semiconductor – properties - energy levels - basic equations of semiconductor devices physics. Solar cells - p-n junction: homo and hetro junctions - metal-semiconductor interface - dark and illumination characteristics - figure of merits of solar cell - efficiency limits - variation of efficiency with band-gap and temperature - efficiency measurements - high efficiency cells – Solar thermo-photovoltaics.

UNIT – IV

SPV System Design and Applications: Solar cell array system analysis and performance prediction-Shadow analysis: reliability - solar cell array design concepts - PV system design - design process and optimization - detailed array design - storage autonomy - voltage regulation - maximum tracking - centralized and decentralized SPV systems - standalone - hybrid and grid connected system - System installation - operation and maintenances - field experience - PV market analysis and economics of SPV systems.

UNIT – V

Solar Passive Architecture: Thermal comfort - bioclimatic classification – passive heating concepts: direct heat gain - indirect heat gain - isolated gain and sunspaces - passive cooling concepts: evaporative

cooling - Radiative cooling - application of wind, water and earth for cooling; shading - paints and cavity walls for cooling - roof radiation traps - earth air-tunnel. – Energy efficient landscape design - thermal comfort.

TEXT BOOKS:

1. Goswami D.Y., Kreider, J. F. and Francis., "Principles of Solar Engineering', Taylor and Francis, 2000.
2. Chetan Singh Solanki, "Solar Photovoltatics – Fundamentals, Technologies and Applications", PHI Learning Private limited, 2011.
3. Sukhatme S.P.,. Nayak.J.P, 'Solar Energy – Principle of Thermal Storage and collection", Tata McGraw Hill, 2008.
4. Solar Energy International, "Photovoltaic – Design and Installation Manual" – New Society Publishers, 2006.
5. Roger Messenger and Jerry Vnetre, "Photovoltaic Systems Engineering", CRC Press, 2010.

VII Semester	L	T	P	C
	0	0	4	2

CAD/CAM LAB(18ME7L12)

GEOMETRIC MODELING

1. Write program for translation, scaling and rotation.
2. Write program for generating spline Bezier and B-spline.
3. Write program for sweep surfaces and surface of revolution.
4. Blend surfaces using any software.
5. Create wireframe, surface and solid models.
6. Introduction to CNC Machines and G-Code, M-Codes
7. CNC part programming for operations like turning, step turning, taper turning, threading.
8. CNC program for plane milling, drilling operations.
9. Generation of CNC part programming with CAM packages for a given 3D models.
10. Development of APT programming for 2D objects
11. Programming for Robot pick and place and continuous path.

VII Semester	L	T	P	C
	0	0	4	2

MINI PROJECT(18ME7P13)

VIII

SEMESTER

SYLLABUS

VIII Semester	L	T	P	C
	3	0	0	3

MECHANICAL VIBRATIONS(18ME8T01)

PROFESSIONAL ELECTIVE -3

UNIT - I

Single Degree Freedom Systems: Un-damped free vibration: Classical method, Energy method, equivalent systems, torsional systems. Damped free vibration- Viscous damping, under damping, critical damping, over damping. Coulomb damping, equivalent damping coefficient. Simple problems.

UNIT - II

Forced vibrations of Single Degree Freedom Systems : Steady state forced vibration, sources of excitation, impressed harmonic force, resonance impressed force due to unbalance, motion excitation, transmissibility and isolation, performance of different type of isolators, power absorbed by viscous damping.

UNIT - III

Two Degree Freedom Systems: Formulation of Equation of motion, Natural frequencies and modes of vibration by classical method, coupled pendulum, forced vibration, dynamic vibration absorber.

UNIT - IV

Multi Degree Freedom Systems: Lagrangian method for formulation of equation of motion Influence co-efficient method, Lumped mass and distributed mass systems, Stodola method, Holzer's method, model analysis of free and forced vibrations.

Whirling of shafts: Critical speed of shafts, Rayleigh's upper bound approximation, Dunkerley's lower bound approximation, critical speed of shafts with damping

UNIT - V

Vibration measurement and Applications: Transducers: variable resistance transducers, Piezoelectric transducers, electrodynamic transducers and linear variable differential transformer transducer; Vibration pickups: vibrometer, accelerometer, velometer and phase distortion; Frequency-measuring instruments; Vibration exciters- Mechanical exciters and electrodynamic shaker.

Text books:

1. Singrasu S. Rao, Mechanical Vibrations, 6/e, Pearson Education, 2018.

2. G.K.Groover, Mechanical Vibrations, 8/e, 2009

Reference books:

1. L. Meirovich, Elements of Vibrations Analysis, Tata McGraw Hill, 1986
2. S. Graham Kelly, Mechanical Vibrations, Tata McGraw Hill, 1996
3. William Thomson, Theory of Vibrations with Applications, 5/e, Pearson, 2008
4. William Weaver, Timeoshenko, and Young, Vibration Problems in Engineering, 5/e, John Wiley, 2013.

VIII Semester	L	T	P	C
	3	0	0	3

AUTOMOBILE ENGINEERING(18ME8T02)

PROFESSIONAL ELECTIVE -3

UNIT - I

Introduction to vehicle structure and engine components: Vehicle construction - Chassis and body - Specifications - Engine - Types - Construction - Location of engine - Cylinder arrangement - Construction details - Cylinder block - Cylinder head - Cylinder liners - Piston – piston rings - Piston pin - Connecting rod - Crankshaft - Valves. Lubrication system - Types - Oil pumps - Filters - Cooling system - Types - Water pumps - Radiators - Thermostats - Anti-freezing compounds.

UNIT - II

Ignition, fuel supply and emission control system: Ignition system - Coil and Magneto - Spark plug - Distributor – Electronic ignition system - Fuel system - Carburetor - Fuel pumps - Fuel injection systems - Mono point and Multi point – Unit injector – Nozzle types - Electronic Fuel Injection system (EFI) – GDI, MPFI, DTSI-Automobile Emissions - Source of formation – Effects on human health and environment - Control techniques - Exhaust Gas Recirculation (EGR) - Catalytic converter - Emission tests and standards (Indian and Europe)

UNIT - III

Transmission system: Clutches - Function - Types - Single plate, Multiple plate and Diaphragm Clutch – Fluid coupling - Gearbox - Manual - Sliding - Constant - Synchromesh - Overdrive – Automatic transmission - Torque converter - Epicyclic and Hydromatic transmission – Continuously variable transmission - Universal joint - Propeller shaft - Hotchkiss drive – Final drive - Rear axle assembly - Types -Differential - Need - Construction – Non-slip differential – Differential locks - Four wheel drive.

UNIT - IV

Steering, suspension and braking system: Principle of steering - Steering Geometry and wheel alignment - Steering linkages – Steering gearboxes - Power steering - front axle - Suspension system - Independent and Solid axle – coil, leaf spring and air suspensions - torsion bar - shock absorbers – Wheels and Tires - Construction - Type and specification - Tire wear and causes - Brakes - Needs – Classification –Drum and Disc Mechanical - Hydraulic and pneumatic - Vacuum assist – Retarders – Anti-lock Braking System(ABS)

UNIT - V

Automobile electrical systems, instrumentation and advances in automobile engineering: Battery-General electrical circuits-Dash board instrumentation - Passenger comfort – Safety and security - HVAC - Seat belts - Air bags - Automotive Electronics - Electronic Control Unit (ECU) - Variable Valve Timing (VVT) - Active Suspension System (ASS) - Electronic Brake Distribution (EBD) – Electronic Stability Program(ESP) Traction Control System (TCS) - Global Positioning System (GPS) - X-by-wire - Electric - Hybrid vehicle.

TEXTBOOKS:

1. William.H.Crouse, Automotive Mechanics, 10/e Edition, McGraw-Hill, 2006.
2. David A. Corolla, Automotive Engineering: Powertrain, Chassis System and Vehicle Body, Butterworth-Heinemann Publishing Ltd., 2009.
3. Richard Stone, Jeffrey K. Ball, Automotive Engineering Fundamentals" SAE International, 2004.

REFERENCES:

1. Bosch, Automotive Hand Book, 6/e SAE Publications, 2007.
2. K. Newton and W. Steeds, The motor vehicle, 13/e Butterworth-Heinemann Publishing Ltd.
3. Kirpal Singh, Automobile Engineering, Vol.1&2, Standard Publications.

VIII Semester	L	T	P	C
	3	0	0	3

NON-DESTRUCTIVE TESTING(18ME8T03)

PROFESSIONAL ELECTIVE -3

UNIT I

Introduction to non-destructive testing: Radiographic test**,** Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography.

UNIT II

Ultrasonic test: Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect , Ultrasonic Transducers and their Characteristics, Ultrasonic Equipment and Variables Affecting Ultrasonic Test, Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection - Effectiveness and Limitations of Ultrasonic Testing.

UNIT III

Liquid Penetrant Test: Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing**.**

Eddy Current Test: Principle of Eddy Current, Eddy Current Test System, Applications of Eddy Current-Testing Effectiveness of Eddy Current Testing.

Magnetic Particle Test: Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test, Magnetic Particle Test Equipment, Magnetic Particle Test Procedure, Standardization and Calibration, Interpretation and Evaluation, Effective Applications and Limitations of the Magnetic Particle Test.

UNIT IV

Infrared And Thermal Testing: Introduction and fundamentals to infrared and thermal testing–Heat transfer –Active and passive techniques –Lock in and pulse thermography–Contact and non contact thermal inspection methods–Heat sensitive paints –Heat sensitive papers –-thermally quenched phosphors liquid crystals –techniques for applying liquid crystals –other temperature sensitive coatings –Inspection methods –Infrared radiation and infrared detectors–thermo mechanical behavior of materials–IR imaging in aerospace applications, electronic components, Honey comb and sandwich structures–Case studies.

UNIT V

Industrial Applications of NDE: Span of NDE Activities Railways, Nuclear, Non-nuclear and Chemical Industries, Aircraft and Aerospace Industries, Automotive Industries, Offshore Gas and Petroleum Projects, Coal Mining Industry, NDE of pressure vessels, castings, welded constructions

TEXT BOOKS:

1. J Prasad, GCK Nair , Non destructive test and evaluation of Materials, Tata mcgraw-Hill Education Publishers, 2008.
2. Josef Krautkrämer, Herbert Krautkrämer, Ultrasonic testing of materials, 3/e, Springer-Verlag, 1983.
3. X. P. V. Maldague, Non destructive evaluation of materials by infrared thermography, 1/e, Springer-Verlag, 1993.

REFERENCES:

1. Gary L. Workman, Patrick O. Moore, Doron Kishoni, Non-destructive, Hand Book, Ultrasonic Testing, 3/e, Amer Society for Nondestructive, 2007.
2. ASTM Standards, Vol 3.01, Metals and alloys

VIII Semester	L	T	P	C
	3	0	0	3

EXPERIMENTAL STRESS ANALYSIS(18ME8T04)
PROFESSIONAL ELECTIVE -4

UNIT – I

Introduction: Stress, strain, Plane stress and plane strain conditions, Compatibility conditions. Problems using plane stress and plane strain conditions, stress functions, mohrs circle for stress strain, Three-dimensional stress strain relations.

UNIT – II

Strain Measurement and Recordings: Various types of strain gauges, Electrical Resistance strain gauges, semiconductor strain gauges, strain gauge circuits. Introduction, static recording and data logging, dynamic recording at very low frequencies, dynamic recording at intermediate frequencies, dynamic recording at high frequencies, dynamic recording at very high frequencies, telemetry systems.

UNIT – III

Photo elasticity: Photo elasticity – Polariscope – Plane and circularly polarized light, Bright and dark field setups, Photo elastic materials – Isochromatic fringes – Isoclinics

Three dimensional Photo elasticity : Introduction, locking in model deformation, materials for three-dimensional photo elasticity, machining cementing and slicing three-dimensional models, slicing the model and interpretation of the resulting fringe patterns, effective stresses, the sheardifference method in three dimensions, applications of the Frozen-stress method, the scatteredlight method.

UNIT – IV

Brittle coatings: Introduction, coating stresses, failure theories, brittle coating crack patterns, crack detection, ceramic based brittle coatings, resin based brittle coatings, test procedures for brittle coatings analysis, calibration procedures, analysis of brittle coating data. Moire Methods: Introduction, mechanism of formation of Moire fringes, the geometrical approach to Moire-Fringe analysis, the displacement field approach to Moire-Fringe analysis, out of plane displacement measurements, out of plane slope measurements, sharpening and multiplication of Moire-Fringes, experimental procedure and techniques.

UNIT – V

Birefringent Coatings Introduction, Coating stresses and strains, coating sensitivity, coating materials, application of coatings, effects of coating thickness, Fringe-order determinations in coatings, stress separation methods.

TEXT BOOKS :

1. Theory of Elasticity by Timoshenke and Goodier Jr
2. Experimental stress analysis by Dally and Riley,Mc Graw-Hill

REFERENCES:

1. A treatise on Mathematical theory of Elasticity by LOVE .A.H
2. Photo Elasticity by Frocht 3. Experimental stress analysis, Video course by K.Ramesh / NPTEL

VIII Semester	L	T	P	C
	3	0	0	3

DESIGN FOR MANUFACTURING(18ME8T05)

(PROFESSIONAL ELECTIVE -4)

UNIT - I

Introduction: Design philosophy-steps in design process-general design rules for manufacturability-basic principles of designing for economical production-creativity in design.

Materials: Selection of materials for design-developments in material technology-criteria for material selection-material selection interrelationship with process selection-process selection charts.

UNIT - II

Machining processes: Overview of various machining processes-general design rules for machining dimensional tolerance and surface roughness-Design for machining – ease –redesigning of components for machining ease with suitable examples. General design recommendations for machined parts.

UNIT - III

Metal casting: Appraisal of various casting processes, selection of casting process,-general design considerations for casting-casting tolerance-use of solidification, simulation in casting design-product design rules for sand casting.

Metal joining: Appraisal of various welding processes, factors in design of weldments – general design guidelines-pre and post treatment of welds-effects of thermal stresses in weld joints-design of brazed joints.

UNIT – IV

Forging: Design factors for forging – closed die forging design – parting lines of dies – drop forging die design – general design recommendations.

Extrusion & Sheet metal work: Design guide lines extruded sections-design principles for punching, blanking, bending, deep drawing-Keeler Goodman forging line diagram – component design for blanking.

UNIT- V

Plastics: Visco elastic and creep behavior in plastics-design guidelines for plastic components-design considerations for injection moulding – design guidelines for machining and joining of plastics.

TEXT BOOKS:

1. George E Dieter and Linda Schmidt, Engineering Design, 4th Edition, McGraw Hill (2015)
2. A.K.Chitale and R.C.Gupta, Product Design and Manufacturing, 5th Edition, PHI Learning (2011)
3. David M Anderson, Design for Manufacturability, CRC Press (2013)

REFERENCES:

1. James G Bralla, Design For Manufacturability Handbook, 2nd Edition, McGraw Hill (2004)
2. Dr.P.C.Sharma, Production Technology, S.Chand & Company (2009)

VIII Semester	L	T	P	C
	3	0	0	3

REFRIGERATION & AIR-CONDITIONING(18ME8T06)

PROFESSIONAL ELECTIVE -4

UNIT – I

Introduction to Refrigeration: Necessity and applications – unit of refrigeration and C.O.P. – Mechanical refrigeration – types of ideal cycles of refrigeration. Air refrigeration: bell Coleman cycle - open and dense air systems – refrigeration systems used in air crafts and problems.

UNIT – II

Vapour Compression Refrigeration: Working principle and essential components of the plant – simple vapour compression refrigeration cycle – COP – representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – actual cycle influence of various parameters on system performance – use of p-h charts – numerical problems.

VCR System Components: Compressors – general classification – comparison – advantages and disadvantages. Condensers – classification – working principles evaporators – classification – working principles expansion devices – types – working principles

UNIT – III

Refrigerants – Desirable properties – classification - refrigerants used – nomenclature – ozone depletion – global warming

Vapor Absorption System: Calculation of maximum COP – description and working of NH_3 – water system and Li Br –water (Two shell & Four shell) System, principle of operation three fluid absorption system, salient features.

Steam Jet Refrigeration System: Working principle and basic components, principle and operation of (i) thermoelectric refrigerator (ii) vortex tube.

UNIT – IV

Introduction to Air Conditioning: Psychometric properties & processes – characterization of sensible and latent heat loads — need for ventilation, consideration of infiltration – load concepts of RSHF, GSHF- problems, concept of ESHF and ADP temperature.

Requirements of human comfort and concept of effective temperature- comfort chart –comfort air conditioning – requirements of industrial air conditioning, air conditioning load calculations.

UNIT – V

Air Conditioning Systems: Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers. Heat pump – heat sources

TEXT BOOKS:

1. A Course in Refrigeration and Air conditioning / SC Arora & Domkundwar / Dhanpatrai
2. Refrigeration and Air Conditioning / CP Arora / TMH.

REFERENCES:

1. Refrigeration and Air Conditioning / Manohar Prasad / New Age.
2. Principles of Refrigeration /Dossat / Pearson Education.
3. Basic Refrigeration and Air-Conditioning / Ananthanarayanan / TMH

VIII Semester	L	T	P	C
	3	0	0	3

CONDITION MONITORING AND SIGNAL CONDITIONING(18ME8T07)
PROFESSIONAL ELECTIVE -5

UNIT I

Introduction to condition monitoring: Basic concept, techniques - visual monitoring, temperature monitoring, vibration monitoring, lubricant monitoring, crack monitoring, thickness monitoring, noise and sound monitoring.

UNIT II

Basic signal processing techniques: Probability distribution and density, Fourier analysis, Hilbert Transform, Cepstrum analysis, Digital filtering, Deterministic/random signal separation, Time-frequency analysis

Wavelet transform: Introduction to Wavelets, Continuous Wavelet Transform (CWT), Discrete wavelet transform (DWT), Wavelet Packet Transform (WPT),types of wavelets – Haarwavelets,Shannon wavelets, Meyer wavelets, Daubechies wavelets, Coifmann wavelets and applications of wavelets.

UNIT III

Vibration monitoring, mention bearing and gear faults: Introduction, vibration data collection, techniques, instruments, transducers, selection, measurement location, time domain analysis, frequency domain analysis, time-frequency domain analysis and commonly witnessed machinery faults diagnosed by vibration analysis. Vibration signals from rotating and reciprocating machines – signal classification, signals generated by rotating machines, signals generated by reciprocating machines. Introduction, construction, types of faults, rolling element, rolling element bearing diagnostics and gear diagnostics.

UNIT IV

Other methods in condition monitoring: Wear monitoring and lubricant analysis - sources of contamination, techniques, Spectrometric Oil Analysis Procedure (SOAP) and ferrography, Radiographic test**,** Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography.

UNIT V

Machine tool wear monitoring techniques and case studies.

TEXTBOOKS:

1. Robert Bond Randall, Vibration-Based Condition Monitoring: Industrial, Aerospace and Automotive applications, John Wiley & Sons Ltd., 2011
2. R.A.Collacot, Mechanical Fault Diagnosis, Chapman and Hall Ltd., 1977.
3.

REFERENCES:

1. John S.Mitchell, Introduction to Machinery Analysis and Monitoring, PennWell Books,1993
2. R.C.Mishra, K.Pathak, Maintenance Engineering and Management, Prentice Hall of India Pvt. Ltd., 2002.
3. Amiya Ranjan Mohanty, Machinery Condition Monitoring: Principles and Practices,CRC press, 2014.

VIII Semester	L	T	P	C
	3	0	0	3

COMPUTATIONAL FLUID DYNAMICS(18ME8T08)
PROFESSIONAL ELECTIVE -5

UNIT - I

Elementary Details in Numerical Techniques: Number system and errors, representation of integers, fractions, floating point arithmetic, loss of significance and error propagation, condition and instability, computational methods for error estimation, convergence of sequences.

UNIT - II

Applied Numerical Methods: Solution of a system of simultaneous linear algebraic equations, iterative schemes of matrix inversion, direct methods for matrix inversion, direct methods for banded matrices.

Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, and special forms of the Navier-stokes equations.

UNIT - III

Steady flow, dimensionless form of momentum and energy equations, stokes equation, conservative body force fields, stream function - vorticity formulation.

Finite difference applications in heat conduction and convention – heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT - IV

Finite differences, discretization, consistency, stability, and fundamentals of fluid flow modelling: introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT - V

Introduction to first order wave equation, stability of hyperbolic and elliptic equations, fundamentals of fluid flow modelling, conservative property, the upwind scheme.

Finite Volume Method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, upwind interpolation, linear interpolation and quadratic interpolation.

TEXT BOOKS:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar/Butter-worth Publishers.
2. Computational fluid dynamics - Basics with applications /John. D. Anderson / McGraw Hill.

REFERENCES:

1. Computational Fluid Flow and Heat Transfer/ Niyogi/Pearson Publications.
2. Fundamentals of Computational Fluid Dynamics /Tapan K. Sengupta / Universities Press.
3. Computational fluid dynamics: An introduction, 3rd edition/John. F. Wendt/ Springer publishers.

VIII Semester	L	T	P	C
	3	0	0	3

ADVANCED MACHINING PROCESSES(18ME8T09)
PROFESSIONAL ELECTIVE -5

UNIT-I

Introduction to advanced machining processes and their classifications- Ultrasonic machining, Magnetic abrasive finishing (MAF) Abrasive jet machining (AJM) Water jet cutting (WJC) and Abrasive water jet machining (AWJM).

UNIT-II

Magnetic abrasive finishing (MAF), Abrasive flow finishing (AFF), Magnetorheological finishing (MRF) and Magnetorheological abrasive flow finishing (MRAFF).

UNIT-III

Electric Discharge Machining and Wire electric discharge machining, Electro Chemical machining, Abrasive and water jet cutting process.

UNIT-IV

Production of Lasers and Laser beam machining (LBM), Power source for plasma and Plasma arc machining (PAM), and Electron Beam Machining (EBM). Advantages and limitations.

UNIT-V

Multi spindle CNC lathe machines and its types with applications. Introduction to part programming, G codes and M codes, programming format and sequence numbers(N). Construction and working of Capstan and Turret lathes. Indexing and bar mechanism in capstan lathe.

VIII Semester	L	T	P	C
	3	0	0	3

SEMINAR (18ME8S10)

VIII Semester	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

PROJECT (18ME8P11)