SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, Tirupati- 517 102

Supporting Document for 1.1.3

Courses having focus on

Employability/ Entrepreneurship/ skill Development

Regulations: SVEC-10

The Courses (with course outcomes) under SVEC-10 Regulations which focus on ***employability/ entrepreneurship/ skill development*** are highlighted with the following colors.

Skill Development

Employability

Entrepreneurship

III B.Tech. I Semester

10BT4HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY

(Common to ECE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITE: --

COURSE DESCRIPTION:

Managerial Economics; Demand and Elasticity of Demand; Production Functions; Markets and Pricing Policies; Formation of different types of Business Organizations; Principles of Accounting; Final Accounts; Capital Budgeting and its Techniques; and Computerized Accounting with Tally software.

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

CO1. Demonstrate Knowledge in

a) Tools and concepts of Micro Economics.
b) Basic Principles and concepts of Accountancy.
c) Provides life skills for effective utilization of scarce resources.
d) Financial Accounting.
e) Using advanced tools like tally and SAP.
f) Significance of Economics and Accountancy

CO2. Develop skills in providing solutions for

a) Managerial decisions of an organization.
b) Demand & Supply, Production & Cost and Markets & Price through Economic theories.
c) Financial data in decision making.

CO3. Develop effective communication in Business and Accounting transactions.

CO4. Ascertain the profitability and soundness of the organization.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS
Definition, Nature and scope of managerial economics. Demand Analysis: Determinants of demand – Demand Function-Law of demand and its exceptions. Elasticity of demand. Types, Measurement and significance of Elasticity of demand. Demand forecasting and methods of demand forecasting.

UNIT-II: THEORY OF PRODUCTION AND COST ANALYSIS
Production Function: isoquants and isocosts. Input – output relationship. Law of returns, internal and external economies of scale. Cost Concepts: opportunity Vs out lay costs, Fixed Vs Variable costs, Explicit Vs implicit costs, out of pocket Vs inputted costs. Break Even Analysis (BEA), Determination of break even point (Simple problems).

UNIT-III: INTRODUCTION TO MARKETS AND PRICING
Market Structure: Types of Markets. Features of Perfect competition. Monopoly and Monopolistic competition. Price and Output determination in Perfect competition and Monopoly. Pricing: Objectives and policies of Pricing – Sealed bid pricing, Marginal cost pricing, Cost plus pricing, Going rate pricing, Limit Pricing, Market Penetration, Market Skimming, Block pricing, Bundling, Peak load pricing, Cross subsidization, Duel Pricing, Administrated pricing.

UNIT-IV: BUSINESS AND NEW ECONOMIC ENVIRONMENT
Characteristic features of Business, features and evolution of Sole proprietorship, Partnership, Joint stock Company, New Economic policy 1991.

UNIT-V: INTRODUCTION AND PRINCIPLES OF ACCOUNTING
Accountancy: Introduction – Concepts – Conventions – Accounting Principles - Double Entry Book Keeping, Journal, Ledger, Trail Balance (Simple Problems).

UNIT-VI: FINAL ACCOUNTS
Introduction to Final Accounts. Trading Account, Profit and Loss Account, and Balance Sheet with simple adjustments (Simple Problems).

UNIT-VII: CAPITAL AND CAPITAL BUDGETING
Capital: Significance, Types of capital. **Capital Budgeting:** Nature and scope of capital budgeting. Features and Methods of capital budgeting. Pay Back Period Method, Accounting Rate of Return Method, Internal Rate of Return Method, Net present Value Method and Profitability Index (Simple Problems).

UNIT-VIII: COMPUTERIZATION OF ACCOUNTANCY SYSTEM
Manual Accounting Vs Computerized Accounting – Advantages and Disadvantages of Computerized Accounting – Using Accounting Software. Tally: Tally features – Company Creation – Account Groups – Group Creation – Ledger Creation**.**

TEXT BOOKS:

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, 3rd Edition, TMH, 2007.
2. R. Cauvery, U.K.Sudhanayak, M.Girija and R. Meenakshi, *Managerial Economics,* 1st Edition, S.Chand and company, New Delhi, 1997.

REFERENCE BOOKS:

1. Ms. Samba Lalita, *Computer Accounting Lab Work*, 1st Edition, Kalyani Publishers, Ludhiana, 2009.
2. Vershaney and Maheswari, *Managerial Economics,* 19th Edition Sultan Chand and Sons, New Delhi, 2005.
3. H.Craig Petersen & W.Cris Levis, *Managerial Economics*, 4th Edition, Pearson Education, 2009.
4. Lipsy and Chrystel, *Economics,* 4th Edition, Oxford University Press, New Delhi, 2008.
5. S.N.Maheswari & S.K.Maheswari, *Financial Accounting,* 4th Edition, Vikas Publishing House, 2005.
6. S.P.Jain & K.L.Narang, *Financial Accounting,* 5th Edition, Kalyani Publishers, Ludhiana, 2000.

III B.Tech. I Semester

10BT50101 : **STRUCTURAL ANALYSIS – II**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Structural analysis – I

Course Description: Analysis of moving loads; influence lines; moment distribution method; slope-deflection method; Kani's method; energy method; redundant pin-jointed frames; multi storey frames (approximate methods).

Course Objectives:

- To introduce concept of moving loads & influence lines.
- Gain Skills in the analysis of beams and frames using different methods
- To apply the different loading conditions to find the deflections of beams.
- To recommend different trusses for the construction of structures.

Course Outcomes:

- Able to calculate beam deflections using different methods.
- Understand the concepts of Moving loads , influence lines, slope deflection, moment distribution method, KANI's method and energy methods.
- Give solutions to the multistoried frames using different methods.
- Use software for analyzing the structures.
- Conduct research to find the solutions in the analysis of frames.

UNIT-I

MOVING LOADS : Maximum SF and BM at a given section and absolute maximum SF and BM due to single concentrated load, UDL longer than the span, UDL shorter than the span, two point loads and several point loads – Equivalent uniformly distributed load – Focal length.

UNIT-II

INFLUENCE LINES: Influence line for support reaction, shear force and bending moment – Load position for maximum SF and for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses.

UNIT-III

MOMENT DISTRIBUTION METHOD: Basic concepts - Stiffness factor – Carry over factor - Application to continuous beams with and without settlement of supports.

UNIT IV

SLOPE–DEFLECTION METHOD: Basic concepts - Slope deflection equation - Application to continuous beams with and without settlement of supports.

UNIT–V
KANI'S METHOD: Analysis of continuous beams including settlement of supports - Single bay, single storey portal frames without side sway.

UNIT-VI
ENERGY METHOD: Strain 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 plane trusses.

UNIT-VII
REDUNDANT PIN-JOINTED FRAMES : Introduction to indeterminate frames – Static and kinematic indeterminacies – Castigliano's theorem – Analysis of pin-jointed frames with upto two degrees of internal and external indeterminacies.

UNIT – VIII
MULTI STOREY FRAMES (Approximate Methods) : Substitute frame method (Two cycle method) for gravity loads – Portal method and cantilever method for lateral loads.

TEXT BOOKS

1. R.S.Khurmi, *Theory of Structures,* 11th Edition, S.Chand Publications, New Delhi, 1987.
2. V.N. Vazirani, M.M.Ratwani and S.K.Duggal, *Analysis of Structures - Vol.II,* 16th Edition, Khanna Publications, New Delhi, 2011.

REFERENCES

1. H.J.Shah and S.B.Junnarkar, *Mechanics of Structures – Vol. II,* 21st Edition, Charotar Publishing House, Anand, Gujrat, 2010.
2. Pandit, G., Gupta, S. and Gupta.R., *Theory of Structures – Vol. II,* 1st Edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 1999.
3. Punmia, B. C., Ashok Kumar Jain and Arun Kumar Jain, *SMTS–II - Theory of Structures,* 12th Edition, Laxmi Publications (P) Ltd, New Delhi, 2004.
4. Ramamrutham, S. and Narayanan, R., *Theory of Structures,* 9th Edition, Dhanpat Rai Publishing Co. Ltd., New Delhi, 2010.

III B.Tech. I Semester

10BT50102 **: REINFORCED CEMENT CONCRETE STRUCTURES – II**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: RCCS I

Course Description: Design of stair cases; shallow foundations; pile foundations; retaining walls; domes; underground and overhead water tanks; prestressed concrete.

Course Objectives:

- To understand the general mechanical behavior of reinforced concrete.
- To analyze and design reinforced concrete flexural members & reinforced concrete compression members.
- To design for vertical and horizontal shear in reinforced concrete and to analyze transfer and development length of concrete reinforcement.
- To use IS codes for the economic design of RC structures.

Course Outcomes:

- To apply the design codes relevant to the design of reinforced concrete members.
- Familiar with professional and ethical issues and understand the importance of structural engineering.
- Design the bunkers, silos and chimneys due to different loading conditions.

UNIT-I

STAIRCASES: Types of staircases - Stairs spanning longitudinally and transversally.

UNIT-II

FOUNDATIONS : Combined footings - Strap footing - Raft foundations.

UNIT-III

PILE FOUNDATIONS : Design of piles and pile caps – Underreamed piles – Grade beams

UNIT-IV

RETAINING WALLS : Lateral earth pressure - Design of cantilever and counter fort retaining walls.

UNIT-V

DOMES : Circular domes – Stresses - Membrane theory - Design.

UNIT-VI

WATER TANKS-I : Design of members in tension - Minimum steel areas and covers - Design of circular water tanks resting on ground.

UNIT VII

WATER TANKS-II : Design of underground water tanks – Overhead water tanks – Circular beams.

UNIT-VIII

PRESTRESSED CONCRETE : Introduction to prestressing - Materials - Types of prestressing – Loss of prestress – Pretensioning and posttensioning - Design of simple beams.

TEXT BOOKS

1. S. Unnikrishna Pillai and Devdas Menon, *Reinforced Concrete Design,* 3nd Edition, Tata Mc.Graw Hill, New Delhi, 2010.
2. N.C. Sinha and S.K. Roy, *Fundamentals of Reinforced Concrete,* 5th Edition, S. Chand Publishers, 2010.

REFERENCES

1. P.C. Varghese, *Limit State Design of Reinforced Concrete*, Prentice Hall of India, New Delhi, 2nd Edition, 2010.
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Reinforced Concrete Structures - Vol. I and Vol.II*, Laxmi, Publications Pvt. Ltd., New Delhi, 19th Edition, 2010

III B.Tech. I Semester
10BT50103 : **ENGINEERING HYDROLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Fluid Mechanics I and II

Course Description: Hydrologic cycle; applications and history; weather and seasons in India; precipitation; evaporation and evapotranspiration; runoff; hydrographic analysis; design flood; groundwater hydrology; well hydraulics.

Course Objectives:

- To introduce the fundamentals of hydrological cycle, precipitation and infiltration.
- To apply the knowledge of hydrograph analysis in estimating the floods and its frequency.
- To analyze the life of a reservoir using sedimentation studies.
- To use empirical formulae in estimating the runoff and compare with the exact solutions.

Course Outcomes:

- Use principles of science for studying the hydrological cycle.
- Analyze and interpret the rainfall data and measure precipitation.
- Develop solutions in estimating the flood for the safety of public.
- Apply different methods in estimating the flood and conduct investigations.
- Find the life of a reservoir and inform society for their safety.
- Follow professional ethics in forecasting flood and reservoir sedimentation.
- Plan for continuous learning on floods and reservoir.
- Use simulation techniques in estimating the capacity of a reservoir.

UNIT – I
INTRODUCTION TO HYDROLOGY : Definition and scope of hydrology – Hydrologic cycle – Practical applications and historical development – Precipitation – Types and forms of precipitation – Weather and seasons in India.

UNIT – II
PRECIPITATION : Measurement of rainfall – Recording and non- recording type of rain gauges – Errors in measurement – Analysis and interpretation of rain fall data – Mass curve of rainfall – Hyetograph – Double mass curve - Methods of calculation of mean precipitation over an area – Depth-Area-Duration relationships.

UNIT – III
EVAPORATION AND EVAPOTRANSPIRATION: Process – Factors affecting evaporation – Estimation – Methods of reduction.
Infiltration : Definition – Factors affecting infiltration – Infiltration equation and indices – Measurement.
Stream flow : Measurement of discharge – Area velocity method – Moving boat method.

UNIT – IV

RUNOFF: Components – Factors affecting runoff – Rainfall-Runoff relationships – Flow mass curve, Flow duration curves.

UNIT – V

HYDROGRAPHIC ANALYSIS: Components of Hydrograph – Unit Hydrograph – Derivation – Use and limitation of unit hydrograph.

UNIT – VI

DESIGN FLOOD : Methods – envelope curves – Empirical formulae – Rational method – Unit hydrograph method – Frequency analysis – Flood routing.

UNIT – VII

GROUNDWATER HYDROLOGY : Introduction – Forms of subsurface water – Classification of formations – Aquifer characteristics – Porosity – Specific yield.

UNIT – VIII

WELLS : Types of wells – Draw down – Discharge of flow operating in unconfined aquifer – Discharge of flow operating in a confined aquifer – Pumping test – Recuperation test for open wells.

TEXT BOOKS

1. K. Subramanyam, *Engineering Hydrology*, 3rd Edition, Tata McGraw-Hill Education Pvt. Ltd., 2011.
2. P. Jaya Rami Reddy, *A Text book of Hydrology,* 3rd Edition, University Press, Laxmi Publications, 2011.

REFERENCES

1. H.M. Raghunath, *Ground Water,* 3rd Edition, Wiley Eastern Ltd., 2009.
2. David Keith Todd, *Ground Water Hydrology,* 2nd Edition, Wiley India Pvt. Ltd., 2010.
3. V.T. Chow, *Hand Book of Applied Hydrology,* 2ndEdition, Mc Graw-Hill Education Pvt.Ltd. 2000.

III B.Tech. I Semester

10BT50104 **: SOIL MECHANICS**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Engineering Mechanics

Course Description: Soil formation; types; structure and clay mineralogy; phase diagram; volume-weight relationships; index properties; permeability; seepage; stress distribution; compaction; consolidation; shear strength.

Course Objectives:

- To give basic principles of soil mechanics and study the behavior of soil as an engineering material.
- To develop skills in dealing with soil as a medium of water flow, a medium for structural support and a primary building material.
- To apply various theories for finding out stress distribution in soils.
- To identify the various soils for the construction of a building.

Course Outcomes:

The course introduces the basic principles of engineering behavior of soils, and by the end of this course students should be able to:

- Give engineering classification of a given soil.
- Understand the principle of effective stress, and calculate stresses that influence soil behaviour.
- Calculate water flow through ground, and understand the effects of seepage on the stability of structures.
- Determine soil deformation parameters, and calculate settlement, magnitude and rate of settlement.
- Appreciate the difference between total and effective stress approaches in soil strength determination, and discriminate between drained and undrained conditions.
- Specify soil compaction requirements.
- Conduct laboratory tests, and obtain soil properties and parameters from the test observations and results.

UNIT – I

INTRODUCTION : Soil formation - Types of soils – Soil structure and clay mineralogy – Adsorbed water – Volume-weight relationships - Three-phase diagram.

UNIT – II

INDEX PROPERTIES OF SOILS : Moisture content - Specific gravity – In-situ density - Relative density- Grain size analysis – Sieve and hydrometer methods – Plasticity of soils - Consistency limits and indices – I.S. Classification of soils – Sensitivity – Thixotropy - Activity of soils.

UNIT –III

PERMEABILITY : Soil water – Capillary rise – Flow of water through soils – Darcy's law - Permeability – Factors affecting permeability – Laboratory determination of coefficient of permeability – Permeability of layered systems.

UNIT –IV

SEEPAGE THROUGH SOILS : Effective stress principle - Effective stress under different loading conditions - Seepage pressure **-** Quicksand condition – Seepage through soils – Flownets: Characteristics and Uses - Seepage through earth dams with horizontal filter - Critical hydraulic gradient.

UNIT – V

STRESS DISTRIBUTION IN SOILS : Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart – Approximate methods – Contact pressure distribution.

UNIT – VI

COMPACTION : Mechanism of compaction - Optimum moisture content and maximum dry density - Factors affecting compaction - Effects of compaction on soil properties - Laboratory determination of OMC and MDD - Field compaction methods - Compaction control.

UNIT – VII

CONSOLIDATION OF SOILS : Initial, primary and secondary consolidation - Spring analogy for primary consolidation - Consolidation test - e-p and e-log p curves - Terzaghi's theory of one dimensional consolidation - Coefficient of consolidation – Preconsolidation pressure – Secondary consolidation.

UNIT – VIII

SHEAR STRENGTH OF SOILS : Mohr-Coulomb failure theories – Types of laboratory shear strength tests – Strength tests based on drainage conditions and their field applicability – Shear strength of cohesionless soils – Critical void ratio – Liquefaction - Shear strength of cohesive soils.

TEXT BOOKS

1. Gopal Ranjan and ASR Rao, *Basic and Applied Soil Mechanics,* 2nd Revised Edition, New age International Pvt . Ltd, New Delhi, 2010.
2. K.R. Arora, *Soil Mechanics and Foundation Engineering,* 7th Edition,Standard Publishers and Distributors, New Delhi, 2010.

REFERENCES

1. Braja.M.Das, *Text Book of Geotechnical Engineering,* 1st Edition, Cengage Learning India, New Delhi, 2009.
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Soil Mechanics and Foundation,* 16th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2005.
3. C. Venkatramaiah, *Geotechnical Engineering,* 3rd Edition,New Age International Publishers, New Delhi, 2010.
4. V. N. S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering,* 3rd Edition, CBS Publishers & Distributors (P) Ltd., New Delhi, 2010.

III B.Tech. I Semester
10BT50105 : **ENGINEERING GEOLOGY**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites:

Course Description: Importance of geology in the civil engineering; weathering; mineralogy; petrology; structural geology; groundwater; earthquakes; landslides; geophysical studies; geological consideration for dams, reservoirs and tunnels.

Course Objectives:

- To provide the basics of geological processes, minerals, rocks and groundwater essential for a civil engineer.
- To design wells, mines and soil exploration programs considering the geological setup.
- To analyze various geological structures, formation of minerals and rocks
- To identify the failures of civil engineering structures due to geological formations.

Course Outcomes:

After the completion of this course, a successful student is able to:

- Apply the knowledge of geological features, the properties of rocks and their suitability as building stones for various civil engineering constructions
- Analyze the failures of structures using geological studies.
- Give recommendations for effective use of rocks, minerals for construction
- Conduct investigations on geological formations and structures
- Use modern methods for carrying out geophysical studies
- Explain the causes of earthquakes, landslides and give recommendations for the benefit of society
- Propose suitable site for mining and civil engineering constructions
- Engage in lifelong learning and involve in geophysical studies

UNIT – I

INTRODUCTION : Importance of geology from civil engineering point of view – Brief study of case histories of failure of some civil engineering constructions due to geological draw backs – Importance of physical geology, petrology and structural geology; Weathering: Effects of weathering of rocks – Importance of weathering with reference to dams, reservoirs and tunnels.

UNIT – II

MINERALOGY : Definition of mineral – Importance of study of minerals – Different methods of study of minerals– Advantages of study of minerals by physical properties - Identification of minerals – Physical properties of common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite – Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Galena, Pyrolusite, Graphite, Magnesite and Bauxite.

UNIT – III

PETROLOGY : Definition of rock – Geological classification of rocks into igneous, sedimentary and metamorphic rocks –Dykes and sills - Common structures, textures – Features of igneous, sedimentary and metamorphic rocks – Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT – IV

STRUCTURAL GEOLOGY : Out crop - Strike and dip – Classification and recognition of folds, faults, unconformities, and joints – Their importance in-situ – Foliation and lineation – Concept of stress and strain, analysis of stress and response of rock to stress – Analysis of deformation and strain ellipsoid – Common types of soils, their origin and occurrence in India.

UNIT – V

GROUNDWATER, EARTHQUAKE AND LANDSLIDES : Groundwater – Water table – Common types of groundwater – Springs – Cone of depression – Geological controls of groundwater movement – Groundwater exploration – Hydrological properties of rocks: porosity, permeability, storativity, specific yield and specific retention Earthquakes, their causes and effects - shield areas and seismic zones – Seismic waves - Richter scale - Precautions to be taken for building construction in seismic areas – Landslides, their causes and effect - Measures to be taken to prevent their occurrence.

UNIT – VI

GEOPHYSICAL STUDIES : Importance of geophysical studies - Principles of geophysical study by gravity methods –Magnetic methods – Electrical resistivity methods – well logging and interpretation – Seismic refraction methods – Radiometric methods and geothermal method – Special importance of electrical resistivity methods and seismic refraction methods.

UNIT – VII

GEOLOGY OF DAMS AND RESERVOIRS : Types of dams – Geological considerations in the selection of a dam site – Analysis of dam failures of the past – Factors contributing to the success of a reservoir.

UNIT – VIII

TUNNELS : Purposes of tunneling – Effects of tunneling on the ground – Geological considerations (i.e., Tithological, structural and groundwater) in tunneling, over break and lining in tunnels.

TEXT BOOKS

1. N.Chennkesavulu, *Engineering Geology,* 2nd Edition, Mc-Millan India Ltd., New Delhi, 2011.
2. D. Venkata Reddy, *Engineering Geology,* 1st Edition, Vikas Publications, New Delhi, 2010.

III B.Tech. II Semester
10BT60101 **: ESTIMATION AND QUANTITY SURVEYING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Surveying and Building materials

Course Description: Standard units; detailed and abstract estimates of buildings, roads and canals; rate analysis; reinforcement bar bending schedule; contracts and tenders; building valuation; specifications.

Course Objectives:
- To introduce the concepts of estimation of building.
- To analyze various sites of the construction of materials and prepare the least estimation for a building.
- To apply depreciation cost based on the life of the structure and material cost.
- To develop the student to find the monetary value of a building on the volume of work done.

Course Outcomes:
- Learn standard units for different items of work in building.
- Calculate various building materials required for a structure.
- Estimate the cost materials and labour required for a construction.
- Prepare agreements ,tenders for building construction and valuation and rent fixation of different building structures.
- Write specification of different material required for a building construction.

UNIT – I
GENERAL ITEMS OF WORK IN BUILDING : Standard Units Principles of working out quantities for detailed and abstract estimates – Calculation of quantities of brick work, RCC, PCC, Plastering, whitewashing, colourwashing and painting/varnishing for shops, rooms, residential building with flat and pitched roof – Approximate method of estimating.

UNIT – II
DETAILED ESTIMATES OF BUILDINGS: Different items of works in building – Principles of taking out quantities – Detailed measurement form – Estimate of RCC building - Long walls - Short wall method and Centre line method – Various types of arches – Calculation of brick work and RCC works in arches.

UNIT – III
ROADS AND CANALS :
Roads: Estimate of bituminous and cement concrete - Estimate of earthwork - Estimate of pitching of slopes - Estimate of earthwork of road from longitudinal sections - Estimate of earthwork in hill roads.
Canals: Earthwork in canals – Different cases – Estimate of earthwork in irrigation channels.

UNIT – IV

RATE ANALYSIS : Working out data for various items of work overhead and contigent charges - Task or out – Turn work - Labour and materials required for different works - Rates of materials and labour - Schedule of Rates - Preparing analysis of rates for the following items of work: Concrete, RCC Works, Brick work in foundation and super structure, plastering, CC flooring, whitewashing.

UNIT-V

REINFORCEMENT BAR SCHEDULE: Reinforcement bar bending and bar requirement schedules.

UNIT – VI

CONTRACTS AND TENDERS :

Contracts: Elements of contract- offer acceptance and consideration - Valid contract - Types of contracts – Lumpsum contract, schedule contract, item rate contract, sub-contracts, joint ventures - Departmental execution of works - Muster Roll Form 21 - Piece work agreement form - Work order. **Tenders:** Contract contractor – Quotation - Earnest money - Security money – Tender - Tender notice, tender form - Bidding procedure, irregularities in bidding – Bidding award - Arbitration disputes and claim settlement.

UNIT – VII

VALUATION OF BUILDINGS: Necessity - Different terms used in valuation and their meaning - Different methods of building valuation and rent fixation - Outgoings – Depreciation - Methods for estimating cost depreciation – Escalation.

UNIT – VIII

SPECIFICATIONS: Purpose and method of writing specifications - General specifications - Detailed specifications for different items of building construction.

TEXT BOOKS

1. B.N. Dutta, *Estimating and Costing,* UBS publishers, New Delhi, 2000.
2. G.S. Birdie, *Estimating and Costing,* Danpatrai Publications, New Delhi, 2009.

REFERENCES

1. M. Chakraborthi, *Estimating Costing Specification and Valuation in Civil Engineering,* 23rd Edition, Laxmi Publications, New Delhi, 2010.
2. Standard Schedule of Rates and Standard Data Book, Public Works Department.
3. IS 1200 (Parts I to XXV–1974/ Method of Measurement of Building and Civil Engineering Works – B.I.S.)
4. National Building Code of India – 2010, BIS, Govt. of India, New Delhi.

III B.Tech. II Semester

10BT60102 **: STEEL STRUCTURES – I**

Internal Marks	**External Marks**	**Total**	**L**	**T**	**P**	**C**
30	**70**	**100**	**4**	**1**	**-**	**4**

Prerequisites: SA & RCCS

Course Description: Design concepts; limit state method; rivetted and bolted connections; welded connections; tension members; compression members; built-up compression members; design of column foundations.

Course Objectives:

- To introduce basic concepts of steel sections, design basics & codal provisions.
- To analyze members subjected to tension & compaction members.
- To apply different loading patterns on the steel members and design both compression and tension members.
- To familiarize the professional and contemporary issues in the design of steel structures.

Course Outcomes:

- Use fundamentals of mathematics to find CG & various sections.
- Analyze various sections, joints, connections of steel members.
- Design tension and compression members.
- Demonstrate the knowledge of steel code for designing members under pure bending.

UNIT-I

DESIGN CONCEPTS : Types of rolled steel sections – Stress-strain relationship for mild steel – Loads – Design concepts of steel structures – Working stress design – Limit state design – Design requirements – Design strength – Serviceability limit state.

By Limit State Method: [IS 800-2007]

UNIT–II

RIVETED AND BOLTED CONNECTIONS : Failure of a joint - Strength and efficiency of a joint - Lap Joint - Butt joint - Eccentric connections.

UNIT - III

WELDED CONNECTIONS : Strength of welds - Butt and fillet welds - Design of fillet welds subjected to axial load - Design of fillet welds subjected to moment acting in the plane and at right angles to the plane of the joints - Beam to beam and beam to column connections.

UNIT–IV

TENSION MEMBERS : Net effective sectional area for angle and tee sections - Design of tension members - Lug angles.

UNIT-V

BEAMS : Bending, shear and bearing strength – Design of simple beams - Design of plated beams - Design of connection of cover plates with the flanges of beams.

UNIT-VI
COMPRESSION MEMBERS : Effective length, radius of gyration and slenderness of compression members - Design strength - Design of axially loaded compression members.

UNIT –VII
BUILT-UP COMPRESSION MEMBERS : Design of built-up compression members - Design of lacings and battens - Design principles of eccentrically loaded columns - Splicing of columns.

UNIT – VIII
DESIGN OF COLUMN FOUNDATIONS : Design of slab base and gusseted bases - Column bases subjected moment.

TEXT BOOKS
1. S.K. Duggal, *Design of steel structures,* 1st Edition, Tata McGraw Hill, New Delhi, 2010
2. N. Subramanian, *Design of steel structures,* 1st Edition, Oxford University Press, 2010

REFERENCES
1. S.S. Bhavikatti, *Design of Steel Structures,* 2ndEdition, I.K. International Publishing House Pvt. Ltd, 2010.
2. N. Krishna Raju, *Structural Design and Drawing,* 3rd Edition, Universities Press, Hyderabad, 2009.
3. Ramachandra and Virendra Gehlot, *Design of Steel Structures,* 11th Edition, Scientific Publishers, Jodhpur, 2005.
4. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of Steel Structures,* 2nd Edition, Laxmi Publications, New Delhi, 2005.

IS Codes: IS -800 – 2007, IS – 875 – Part III and Steel Tables are to be permitted into the examination hall.

III B.Tech. II Semester

10BT60103 **: WATER RESOURCES ENGINEERING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Fluid Mechanics – I and II, Engineering Hydrology

Course Description: Irrigation; soil moisture; diversion head works; reservoirs; gravity and earth dams; canal structures; cross drainage works

Course Objectives:

- To provide basics of irrigation water requirement and factors affecting irrigation efficiency.
- To find the forces acting on a dam and its stability.
- To analyze the parameters required for the site selection of a structure.
- To identify a site for the construction of diversion headworks and lining of canals.

Course Outcomes:

- Find the duty and delta required for a crop from the mathematical principles.
- Analyze the forces acting on a multipurpose dam
- Design a dam and canal structures.
- Carryout research on the stability of dam and provide suitable solutions
- Estimate the reservoir capacity using modern tools.
- Give reasons for the failure of a dam and reservoir.
- Demonstrate the importance of canals and canal lining.
- Responsible in the construction of canal outlets and canal escapes.
- Understand the importance of water resources engineering.

UNIT – I

IRRIGATION : Necessity and importance– Advantages and Disadvantages – Types of Irrigation – Application of irrigation water – Indian agricultural soils – Methods of increasing soil fertility – Standards for irrigation water.

UNIT – II

SOIL MOISTURE : Soil-Water-Plant relationship – Vertical distribution of soil moisture – Soil moisture constants – Consumptive use – Duty-Delta relationship **-** Factors affecting duty – Irrigation efficiency.

UNIT – III

DIVERSION HEAD WORKS : Types of diversion head works – Weirs – Barrages – Layout of diversion works – Causes and failure of hydraulic structures on permeable foundations – Bligh's creep theory – Khosla's theory – Determination of uplift pressure – Impervious floors – Exit gradient – Functions of upstream and downstream sheet piles.

UNIT – IV

DAMS : Types of dams – Merits and demerits – Factors affecting selection of site – Zones of storage of reservoir – Estimation of reservoir capacity – Mass curve.

UNIT – V

GRAVITY DAMS : Forces acting on gravity dam - Causes of failure of gravity dams – Elementary profile and practical profile of gravity dam – Limiting height of a low gravity dam – Stability analysis – Drainage galleries.

UNIT – VI

EARTH DAMS : Types – Causes of failure – Criteria for safe design - Seepage through earth dam – Measures of seepage control.

UNIT – VII

CANAL STRUCTURES : Types of falls – Canal regulation works – Canal outlets.

UNIT – VIII

CROSS DRAINAGE WORKS : Types – Selection of site aqueducts - Super passages – Level crossing.

TEXT BOOKS

1. S.K. Garg, *Irrigation Engineering and Hydraulic Structures,* 23rd Edition, Khanna Publishers, 2010.
2. B.C. Punmia and P.B.B. Lal, *Irrigation and Water Power Engineering,* 16th Edition, Laxmi Publications, 2011.
3. R.K. Sharma and T.K. Sharma, *Irrigation Engineering,* 3rd Edition, S. Chand Publishers, 2007.

REFERENCES

1. K.R. Arora, Irrigation, *Water Power and Water Resources Engineering*, 4th Edition, Standard Publishers Distributers, 2011.
2. G.L. Asawa, *Irrigation and Water Resources Engineering,* New Age International Limited, 2012

III B.Tech. II Semester

III B.Tech. II Semester

10BT60104 **: ENVIRONMENTAL ENGINEERING – I**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Fluid mechanics –I & II

Course Objectives:

- To inculcate the fundamentals of water collection, treatment and distribution of water.
- To analyze the impurities present in water and its suitability for drinking
- To design water supply system to a building.
- To identify the causes of ill health due to impurities present in water.

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Course Outcomes:

- Analyze the water samples for finding different impurities present in water.
- Identify the problems due to impure water.
- Design a pipe network for supplying water from a main source.
- Carryout research on water treatment and distribution system.
- Use advanced techniques for water sampling analysis.
- Assess the reasons for ill health due to disinfected water consumption and provide necessary solutions to treatment for the benefit of the society.
- Follow professional ethics in testing of water samples.
- Function individually and in team as a public health engineer in public works department to serve society

UNIT – I

INTRODUCTION : Importance of water supply Engineering - Need for protected water supply – Objective of water supply systems – Flow diagram of water supply systems.

UNIT – II

SOURCES AND DEMAND OF WATER : Different sources of water – Quantity and quality of different sources – Types and variation in water demand – Factors affecting water demand – Design period – Forecasting of population, different methods and their suitability.

UNIT – III

WATER COLLECTION, CONVEYANCE AND DISTRIBUTION : Intake works for collection of surface water – Conveyance of water – Gravity and pumping methods – Different materials used for conveying conduits and their suitability – Systems of distribution – Distribution reservoirs – Distribution networks – Design of simple networks – Pipe accessories – Valves and their location and suitability.

UNIT – IV

QUALITY REQUIREMENTS OF WATER : Sources of water pollution – Water borne diseases – Physical, chemical and biological impurities – Tests conducted for determining impurities – Water standards for different uses.

UNIT – V

WATER TREATMENT – I : Conventional water treatment processes units and their functions - Theory and design of aeration, coagulation, flocculation, and clarification - Determination of optimum dose of alum for coagulation of water.

UNIT – VI

WATER TREATMENT – II : Theory of filtration – Different types of filters and their design - Disinfection – Disinfectants – Mechanism of disinfection – Different methods of disinfection – Break point chlorination – Types chlorination – Dose of disinfectant.

UNIT – VII

ADVANCED TREATMENT METHODS : Removal of fluorides, arsenic, hardness, iron and manganese, salinity, colour, organic chemical and biological residues – Adsorption with activated carbon, ion-exchange resins, membrane processes, chemical oxidation and softening.

UNIT – VIII

WATER SUPPLY ARRANGEMENTS IN BUILDINGS : Definition of technical terms used in water supply arrangements – Identification of different water supply of pipes – General layout of water supply in single storey and multi storeyed buildings - Principles and precautions in laying pipe lines in the premises of buildings - Connection from water main to building – Water supply fittings – Detection and prevention of leakage.

TEXT BOOKS

1. G.S. Birdie and J. S. Birdie, *Water Supply and Sanitary Engineering*, 8th Edition, Dhanpat Rai and Sons Publishers, New Delhi, 2010.
2. S.K. Garg, *Environmental Engineering (Vol.I): Water Supply Engineering*, 20th Revised Edition, Khanna Publishers, New Delhi, 2011.

REFERENCES

1. K.N. Duggal, *Elements of Environmental Engineering*, 1st Edition, S.Chand Publishers, New Delhi, 2010.
2. Nazih K. Shammas and Lawrence K. Wang, *Fair, Geyer and Okun's Water and Waste Water Engineering: Water Supply and Wastewater Removal*, 3rd Edition, John Wiley and Sons, New Delhi, 2011.
3. H.S. Peavy and D.R.Rowe, *Environmental Engineering*, 1st Edition, McGraw-Hill Publishing Company, New York, 1984.

III B.Tech. II Semester
10BT60105 **: TRANSPORTATION ENGINEERING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Surveying, Soil Mechanics

Course Description: Planning and geometric design of highways ,Railways ,Airports ; Highway engineering; Traffic characteristics and measurement; Material and construction; analysis and design of flexible and rigid pavements.

Course Objectives:
- To provide basics of highways ,Railways and airports ; development schemes; geometric design of highways, railways and airports
- To design pavements using various methods and to conduct various types of traffic studies.
- To develop skills in the analysis of types of highway pavements , railway tracks and run ways
- To judge sustainability of materials, loads and economical methods of design.

Course Outcomes:
- Apply knowledge of science and maths and engineering fundamentals for transportation solution. Collecting and analysis of transportation data, problems and requirements
- Arrives at transportation solutions compatibility with social economical, environmental and related aspects.
- Design transportation system using latest theories, techniques and methodology
- Construct the transportation projects in highways, Railways tracks, Airports runways, lighting and signaling.
- Develop skills of project management in project initiation, construction and communication, Time cost and quality parameters, legal and ethical Aspects, Maintenance.

UNIT I
HIGHWAY DEVELOPMENT AND PLANNING : Highway development in India – Necessity for highway planning - Different road development plans - Classification of roads - Road network patterns – Highway alignment - Factors affecting alignment - Engineering surveys – Drawings and reports.

UNIT – II
HIGHWAY GEOMETRIC DESIGN: Importance of geometric design - Design controls and criteria- Highway crosssection 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
HIGHWAY MATERIALS: Aggregates and bitumen – Desirable properties – Laboratory tests on aggregate and bitumen, CBR test – Specifications – Aggregate

bitumen mixes – Desirable properties – Mix design by Marshal method – Cement and cement concrete.

UNIT – IV
PAVEMENT DESIGN: Types of pavements – Difference between flexible and rigid pavements – Pavement components – Sub grade, sub base, base and wearing course – Functions of pavement components – Design factors – Flexible pavement design methods – G.I method, CBR method, Triaxial method – Numerical examples – Design of rigid pavements – Critical load positions – Westergaard's stress equations – Computing radius of relative stiffness and equivalent radius of resisting section – Stresses in rigid pavements – Design of expansion and contraction joints in CC pavements. Design of dowel bars and tie bars.

UNIT – V
HIGHWAY DRAINAGE: Importance of highway drainage – Requirements – Surface drainage – Subsurface drainage – Drainage of slopes and erosion control – Road construction in water logged areas and black cotton soils.

UNIT – VI
RAILWAY ENGINEERING: Permanent way components – 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.

UNIT – VII
GEOMETRIC DESIGN OF RAILWAY TRACK : Gradients - Grade compensation - Cant and negative super elevation - Cant deficiency – Degree of curve – Crossings and turn out .

UNIT – VIII
AIRPORT ENGINEERING: Factors affecting selection of site for airport – Aircraft characteristics - Geometric design of runway - Computation of runway length – Correction for runway length – Orientation of runway – Wind rose diagram – Runway lighting system.

TEXT BOOKS

1. S.K. Khanna and C.E.G.Justo, *Highway Engineering,* 8th Edition, Nemchand and Brothers, Roorkee, 2009.
2. S.P. Saxena, S.P. Arora, *Railway Engineering - A Text Book of Transportation Engineering,* 7th Edition, S.Chand and Co. Ltd., 2010.
3. L.R. Kadiyali and Lal, *Highway Engineering Design,* 5th Edition, Khanna Publications, New Delhi, 2009.
4. S.K. Khanna and Arora, *Airport Planning and Design,* 6^{h} Edition, Nemchand and Brothers, Roorkee, 2009.

REFERENCES

1. S.P.Bindra, *Highway Engineering,* 4th Edition, Dhanpat Rai and Sons, New Delhi, 2011.

2. L.R.Kadyali, *Traffic Engineering and Transportation Planning,* 7th Edition, Khanna Publications, 2010.
3. M. M. Agarwal,*Railway Engineering,* 15th Edition, Prabha and Co., New Delhi, 1994.
4. Virendhra Kumar and Statish Chandhra, *Air Transportation Planning and Design,* 1st Edition, Galgotia Publishers, New Delhi, 1999.

Codes:

1. IRC: 37-2001, *Guidelines for the Design of Flexible Pavements*, Second Revision, IRC, New Delhi, 2002 is to be permitted into the examination hall.

III B.Tech. II Semester
10BT60106 : **FOUNDATION ENGINEERING**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Soil Mechanics

Course Description: soil exploration; lateral earth pressure; earth retaining structures; stability of earth slopes; bearing capacity of shallow foundations; allowable bearing pressure; pile foundations; caissions and well foundations.

Course Objectives:

- To provide the knowledge of lateral earth pressure, earth retaining structures, stability of slopes.
- To develop skills in finding the bearing capacity of soils.
- To apply various methods in finding the stability of slope.
- To conduct various tests in soils to recommend suitable type of foundations.

Course Outcomes:

- Assess the soil condition at a given location in order to suggest suitable foundation and also gains the knowledge to design various foundations.
- Gain knowledge of the design methods that can be applied to practical problems.
- Analyze the stability of slopes using different methods and explain the ways for improving the stability of slopes.
- Create awareness on the suitability of a foundation for constructing a structure.

UNIT – I
SOIL EXPLORATION : Need – Planning - Methods of soil exploration – Geophysical methods – Open excavation methods - Boring and sampling methods – Types of soil samples - Field tests: penetration tests, plate load test, in-situ vane shear test, pressure meter test – Observation of groundwater table - Borehole logging – Soil investigation report - Selection of foundation based on soil condition.

UNIT – II
LATERAL EARTH PRESSURE : Types of Earth Pressures – Plastic equilibrium in soils – Rankine's theory – Earth pressures in cohesionless and cohesive soils - Coloumb's wedge theory – Earth pressure on retaining walls of simple configurations - Graphical methods (Rebhann and Culmann) - Pressure on the wall due to single line load alone.

UNIT – III
EARTH RETAINING STRUCTURES: Types of retaining structures - Stability considerations of gravity and cantilever retaining walls - Proportioning of retaining walls - Cantilever sheet pile walls - Anchored bulk heads (free earth support method only).

UNIT – IV
STABILITY OF EARTH SLOPES : Infinite and finite earth slopes – Types of failures – Factor of safety of infinite slopes – Stability analysis of finite slopes:

Swedish arc method, standard method of slices, Bishop's simplified method, Taylor's stability number - Stability of slopes of earth dams under different conditions - Improving stability of slopes.

UNIT – V

BEARING CAPACITY OF SHALLOW FOUNDATIONS : Types and choice of foundation - Depth of foundation - Types of shear failure – Safe bearing capacity – Terzaghi's, Meyerhof's, Skempton's and IS methods - Effect of groundwater table on bearing capacity.

UNIT – VI

ALLOWABLE BEARING PRESSURE: Bearing capacity from penetration tests - Allowable bearing pressure - Safe bearing capacity and settlement from plate load test – Presumptive bearing capacity – Allowable settlements of structures – Settlement analysis

UNIT – VII

PILE FOUNDATIONS : Types of piles – Factors influencing the selection of pile - Load carrying capacity of piles in granular and cohesive soils - Static and dynamic pile formulae – In-situ penetration tests - Pile load tests – Negative skin friction - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT – VIII

CAISSONS AND WELL FOUNDATIONS : Types of caissons - Bearing capacity - Construction of caissons - Advantages and disadvantages of caisson foundations – Comparison of caisson types - Well foundations - Shape – Lateral stability - Terzaghi's analysis - Components of wells - Functions and design - Design criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS

1. K.R. Arora, *Soil Mechanics and Foundation Engineering*, 7th Edition, Standard Publishers and Distributors, New Delhi, 2010.
2. C. Venkatramaiah, *Geotechnical Engineering,* 3rd Edition, New Age International Publishers, New Delhi, 2010.

REFERENCES

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Soil Mechanics and Foundation*, 16th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2005.
2. Gopal Ranjan and A.S.R. Rao, *Basic and Applied Soil Mechanics,* 2nd Revised Edition, New Age International Pvt. Ltd, New Delhi, 2010.
3. Braja M. Das, *Principles of Foundation Engineering,* 6th Edition, Cengage Learning India, New Delhi, 2007.
4. J.E. Bowles, *Foundation Analysis and Design*, 5th Edition, McGraw-Hill Publishing Company, New York, 2001.
5. W.C. Teng, *Foundation Design*, 1st Edition, Prentice Hall Inc., New Jersy, 1962.
6. V.N.S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering*, 3rd Edition, CBS Publishers & Distributors (P) Ltd., New Delhi, 2010.

III B.Tech. II Semester

10BT60114 **: SPREADSHEET APPLICATIONS IN CIVIL ENGINEERING**

(Audit Course)

L	T	P	C
-	3	-	-

Prerequisites: MS Excel; design of beams and hydraulic structures; analyses of frames

Course Description: MS Excel as a Spreadsheet tool; spreadsheet creation; design of slabs, footings; analysis of frames; design of notches, weirs; design of pipes

Course Objectives:

- To introduce the basic concepts of MS excel sheet for spread sheet creation
- To apply the principles of spread sheet for designing the slabs, footings and weirs

Course Outcomes:

- Apply the principles of spread sheet for the formation of the cells, formatting and creation of tables
- Analyze the frames
- Use spread sheet for the design of beams, slabs, flow meters and pipes

LIST OF EXERCISES

1. Introduction to MS Excel as a Spreadsheet tool, overview of toolbars, accessing, saving excel files, using help and resources. Creating a spreadsheet using the features: Gridlines, format cells, summation, auto fill, formatting text, formulae in excel charts.
2. Creating a spreadsheet using the features: Split cells, Sorting, Conditional formatting, freeze panes, pivot tables, data validation.
3. Design of singly reinforced beam
4. Design of doubly reinforced beam
5. Design of one-way slab
6. Design of two-way slab
7. Design of isolated footings
8. Analysis of frames
9. Design of surplus weir
10. Design of trapezoidal notch
11. Design of canal regulator
12. Design of sewer pipe

TEXT BOOKS

1. Sylvan Charles Bloch, *Excel for Engineers and Scientists in Geotechnical Engineering,* Wiley, 2002.
2. Craig T. Christy, *Engineering with the spreadsheet: structural engineering templates using Excel,* ASCE Publications, 2006.

REFERENCES

1. Thomas F. Wolff, *Spreadsheet Applications in Geotechnical Engineering,* 1st Edition, PWS Publishing Company, 1995.

IV B. Tech. I Semester
10BT70101: Remote Sensing and GIS

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Surveying and CABD Lab

Course Description: Aerial photogrammetry; remote sensing: electromagnetic spectrum, sensors; geographic information system: data representation, spatial analysis; water resources applications

Course Objectives:

- To introduce the basic concepts and working knowledge of various components of rapidly expanding fields of Remote Sensing and Geographical Information System
- To apply GIS effectively to find the water storage ,floods , droughts and Ground water potentials.
- To analyze the data using Geospatial techniques.
- To identify the potential applications to environmental and sustainability issues.

Course Outcomes:

After completion of this course, a student is able to :

- Apply the knowledge of aerial photographs, satellite imagery to civil engineering applications
- Analyze the Remote sensing and GIS techniques to generate the geographical information for natural resources.
- Develop solutions for water management and traffic regulations.
- Conduct the survey with GPS and satellite imagery
- Use modern tools for interpretation of the data of a location
- Explain the land use and land cover of a particular area
- Propose suitable methods for Flood and drought mitigation methods.
- Give recommendations for better water resource management

UNIT – I

INTRODUCTION TO PHOTOGRAMMETRY : Principle and types of aerial photographs – stereoscopy – Map vs. Mosaic – Ground control – Parallax measurements for height – Determinations - Techniques of photo interpretation – Aerial and satellite photogrammetry.

UNIT – II

REMOTE SENSING – I : Basic concepts and foundation of remote sensing – Elements involved in remote sensing, electromagnetic spectrum – Spectral reflectance and spectral regions remote sensing terminology and units.

UNIT – III

REMOTE SENSING – II : Energy resources – Energy interactions with earth surface features and atmosphere – Resolution, sensors and satellite visual interpretation techniques – Basic elements – Converging evidence – Interpretation for terrain evaluation – Spectral properties of water bodies – Introduction to digital data analysis – Structure of digital image.

UNIT – IV

GEOGRAPHIC INFORMATION SYSTEM: Introduction to GIS – GIS definition and terminology – GIS categories – Components of GIS, fundamental operations of GIS – Land surveying – Global positioning system.

UNIT – V

TYPES OF DATA REPRESENTATION : Data collection and input overview – Data input and output – Keyboard entry and coordinate geometry procedure – Manual digitizing and scanning – Raster GIS – Vector GIS – File management, spatial data – Layer based GIS – Feature based GIS mapping, map projections.

UNIT – VI

GIS SPATIAL ANALYSIS: Computational analysis methods (CAM) – Visual analysis methods (VAM) – Data storage – Vector data storage – Attribute data storage – Overview of the data manipulation and analysis – Integrated analysis of the spatial and attribute data.

UNIT – VII

WATER RESOURCES APPLICATIONS - I : Land use/Land cover in water resources – Surface water mapping and inventory – Rainfall – Runoff relations and runoff potential indices of watersheds – Flood and drought impact assessment and monitoring – Watershed management for sustainable development and Watershed characteristics.

UNIT – VIII

WATER RESOURCES APPLICATIONS – II : Reservoir sedimentation – Fluvial Geomorphology – Water resources management and monitoring – Ground water targeting – Identification of sites for artificial recharge structures – Drainage Morphometry – Inland water quality survey and management – Water depth estimation and bathymetry.

TEXT BOOKS

1. B. Bhatta, *Remote Sensing and GIS*, 1st Edition, Oxford University Press, New Delhi, 2009.
2. M. Anji Reddi, *A Text Book of Remote Sensing and Geographical Information Systems*, 2nd Edition, B.S. Publications, Hyderabad, 2010.

REFERENCES

1. C.P. Lo Albert and K.W. Yong, *Concepts and Techniques of GIS*, 2nd Edition, Prentice Hall (India) Publications, 2010.
2. Narayana Panigrahi, *Geographical Information Science*, 1st Edition, University Press, New Delhi, 2008.
3. Peter A. Burragh and Rachael Mc Donnell, *Principles of Geographical Information Systems*, 2nd Edition, Oxford University Press, USA, 2005.

IV B.Tech. I Semester

10BT70102**: ENVIRONMENTAL ENGINEERING – II**

Internal Marks	**External Marks**	**Total**	**L**	**T**	**P**	**C**
30	**70**	**100**	**4**	**-**	**-**	**4**

Prerequisites: Environmental Engineering-I

Course Description: Objectives and systems of sewage collection and disposal; quantity of sewage; characteristics of sewage; sewage treatment; sludge management; effluent disposal; Municipal solid waste.

Course Objectives:

- To provide knowledge in selection of treatment and disposal methods
- To develop skills to undertake major projects on wastewater treatment and disposal
- To apply principles of water treatment for removing heavy metals and pathogenic bacteria
- To spread the awareness on the water treatment and recycle and reuse of waste

Course Outcomes:

- Gain knowledge on the characteristics of wastewater treatment processes
- Analyze the various types of waste water samples
- Design waste water treatment plant
- Interpret the data of waste water samples and suggest suitable treatment process.
- Use modern techniques for treating waste water
- Assess the impurities in waste water composition of sludge.
- Understand the impact on the environment due to onsite disposal of waste
- Responsible for the sludge conditioning, utilization and disposal

UNIT – I

INTRODUCTION : Definition of terms – Sewage, sullage, refuse, garbage – Objectives of sewerage works systems of sewage collection and disposal – Conservancy systems – Water carriage systems – Merits and demerits - Sewerage systems – Combined, separate, partially separate and combined systems - Merits and demerits**.**

UNIT – II

QUANTITY OF SEWAGE : Estimation of quantity of municipal waste water – Estimation of quantity of storm water – Different types of sewers, design flows through sanitary sewers, storm sewers and combined sewers - Hydraulic design of sewers – Sewer appurtenances – House drainage and plumbing systems.

UNIT – III

CHARACTERSTICS OF SEWAGE: Sampling of sewage – Characteristics and composition of sewage – Physical, chemical and biological – Total solids – C.O.D – B.O.D – Equation and factors affecting the BOD rate of reaction – Population equivalent.

UNIT – IV

PRELIMINARY AND PRIMARY SEWAGE TREATMENT : Concept of waste water treatment, primary, secondary and tertiary treatment – Conventional treatment process flow diagrams of municipal wastewater treatment plants – Functions of each unit principles and design of screens, grit chamber, and primary setting tanks.

UNIT – V
SECONDARY TREATMENT OF SEWAGE : Principles of biological treatment, nutritional requirement of biological treatment systems, factors affecting biological treatment systems – Design, construction, operation and maintenance of trickling filter, activated sludge process - Oxidation ditch - Stabilization ponds.

UNIT – VI
SLUDGE MANAGEMENT : Quantity and characteristics and types of sludge - Sludge conditioning and dewatering - Handling, treatment, sludge utilization and disposal - Tertiary treatment – Removal of nitrogen, phosphorus, refractory organic, heavy metals, suspended solids and pathogenic bacteria.

UNIT – VII
EFFLUENT DISPOSAL : Standards for disposal – Disposal into surface water bodies – Self purification, zones of pollution – Dissolved oxygen sag curve – Streeter – Phelps equation, marine disposal – On land disposal and treatment systems – Overflow, flooding and irrigation. Onsite disposal systems – Septic tank and effluent disposal system.

UNIT – VIII
MUNICIPAL SOLID WASTE: Characteristics, generation, collection and transportation of solid wastes - Engineered systems for solid waste management – Reuse – Recycling – Energy recovery – Treatment and disposal.

TEXT BOOKS

1. G.S. Birdie and J. S. Birdie, *Water Supply and Sanitary Engineering*, 8th Edition, Dhanpat Rai and Sons Publishers, New Delhi, 2010.
2. P.N. Modi, *Sewage Treatment Disposal and Wastewater Engineering*, 3rd Edition, Standard Publishers Distributors, Delhi, 2011.

REFERENCES

1. S.K. Garg., *Environmental Engineering (Vol. II): Sewage Disposal and Air Pollution Engineering*, 22nd Edition, Khanna Publishers, New Delhi, 2010.
2. Met Calf and Eddy, *Wastewater Engineering*, 4th Edition, TMH Education Pvt. Ltd., New Delhi, 2010.
3. K.N. Duggal, *Elements of Environmental Engineering*, 1st Edition, S.Chand Publishers, New Delhi, 2010.
4. Nazih K. Shammas and Lawrence K. Wang, *Fair, Geyer and Okun's Water and Waste Water Engineering: Water Supply and Wastewater Removal*, 3rd Edition, John Wiley and Sons, New Delhi, 2011.

IV B.Tech. I Semester
10BT70103: **STEEL STRUCTURES – II**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: SA & Rccs

Course Description: Design concepts of steel structures; loads; working stress and limit state design; limit state design of riveted and bolted connections; welded connections; tension members; beams; compression members; built up sections; column foundations.

Course Objectives:
- To introduce basic concepts of steel sections, design basics & codal provisions.
- To analyze members subjected to tension & compaction members.
- To apply different loading patterns on the steel members and design both compression and tension members.
- To familiarize the professional and contemporary issues in the design of steel structures.

Course Outcomes:
- Use fundamentals of mathematics to find CG & various sections.
- Analyze various sections, joints, connections of steel members.
- Design tension and compression members.
- Demonstrate the knowledge of steel code for designing members under pure bending.

UNIT-I
DESIGN CONCEPTS: Types of rolled steel sections – Stress-strain relationship for mild steel – Loads – Design concepts of steel structures – Working stress design – Limit state design – Design requirements – Design strength – Serviceability limit state.
By Limit State Method: [IS 800-2007]

UNIT–II
RIVETED AND BOLTED CONNECTIONS: Failure of a joint - Strength and efficiency of a joint - Lap Joint - Butt joint - Eccentric connections.

UNIT - III
WELDED CONNECTIONS : Strength of welds - Butt and fillet welds - Design of fillet welds subjected to axial load - Design of fillet welds subjected to moment acting in the plane and at right angles to the plane of the joints - Beam to beam and beam to column connections.

UNIT–IV
TENSION MEMBERS: Net effective sectional area for angle and tee sections - Design of tension members - Lug angles.

UNIT-V
BEAMS : Bending, shear and bearing strength – Design of simple beams - Design of plated beams - Design of connection of cover plates with the flanges of beams.

UNIT-VI

COMPRESSION MEMBERS : Effective length, radius of gyration and slenderness of compression members - Design strength - Design of axially loaded compression members.

UNIT –VII

BUILT-UP COMPRESSION MEMBERS : Design of built-up compression members - Design of lacings and battens - Design principles of eccentrically loaded columns - Splicing of columns.

UNIT – VIII

DESIGN OF COLUMN FOUNDATIONS : Design of slab base and gusseted bases - Column bases subjected moment.

TEXT BOOKS

1. S.K. Duggal, *Design of Steel Structures,* 1st Edition, Tata McGraw Hill, New Delhi, 2010
2. N. Subramanian, *Design of Steel Structures,* 1st Edition, Oxford University Press, 2010

REFERENCES

1. S.S. Bhavikatti, *Design of Steel Structures,* 2ndEdition, I.K. International Publishing House Pvt. Ltd, 2010.
2. N. Krishna Raju, *Structural Design and Drawing,* 3rd Edition, Universities Press, Hyderabad, 2009.
3.. Ramachandra and Virendra Gehlot, *Design of Steel Structures,* 11th Edition, Scientific Publishers, Jodhpur, 2005.
4. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Design of Steel Structures,* 2nd Edition, Laxmi Publications, New Delhi, 1998.

IS Codes: IS -800 – 2007, IS – 875 – Part III and Steel Tables are to be permitted into the examination hall.

IV B.Tech. I Semester

10BT70104 **: TRAFFIC ENGINEERING AND MANAGEMENT**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	-	-	4

Prerequisites: Transportation engineering

Course Description: Significance and scope; traffic characteristics; highway capacity; parking studies; traffic control and regulation; traffic and environment; traffic signs and road markings; highway safety; traffic management.

Course Objectives:

- To appreciate the traffic engineering as application of engineering techniques to achieve the safe and efficient movement of people and goods.
- To understand the relationship between different parts of traffic engineering
- This course deals with fundamental introduction of traffic engineering, such as human factor design, geometric design and section design, traffic flow theory analysis, capacity analysis, traffic count methods, signalized intersection analysis; introduction of ITS

Course Outcomes:

- Apply the knowledge of maths, science, and engineering fundamentals for traffic solutions, collecting and analyzing traffic data, accidents data ;traffic volume, speed , density studies, accident studies
- Arrive at highway capacity, design of traffic control and regulation systems.
- Establish the traffic control and regulation systems
- Carryout Road safety audit, accident studies and 3-Es methodology initiation and implementation.
- Give Environmental impact assessment, air pollution, noise pollution and other detrimental impacts of traffic engineering mitigation techniques.
- Develop skills of project management in project initiation, construction and communication, Time cost and quality parameters, legal and ethical Aspects, Maintenance.

UNIT - I

INTRODUCTION TO TRAFFIC ENGINEERING: Significance and scope - Characteristics of vehicles and road users - Skid resistance and braking efficiency (Problems) - Components of traffic engineering - Road, traffic and land use characteristics

TRAFFIC CHARACTERISTICS : Basic characteristics of traffic - Volume, speed and density - Relationship among traffic parameters.

UNIT-II

TRAFFIC MEASUREMENT : Traffic volume studies - Objectives - Types of volume studies – Concept of PCU- Data collection and presentation – Speed studies – Types of speeds - Objectives of speed studies - Methods of conducting speed studies - Data collection and presentation - Statistical methods for analysis of speed data - Origin and destination studies - Pedestrian studies - Basic principles of traffic flow.

UNIT-III

HIGHWAY CAPACITY : Definition of capacity – Importance of capacity – Factors affecting capacity - Concept of level of service - Different levels of service - Concept of service volume - Peak hour factor.

PARKING STUDIES : Types of parking facilities – On street and off street parking facilities - Parking studies - Parking inventory study – Parking survey by patrolling method - Analysis of parking data and parking characteristics - Multi storey car parking facility - Design standards.

UNIT-IV

TRAFFIC CONTROL AND REGULATION : Traffic problems in urban areas - Importance of traffic control and regulation - Traffic regulatory measures - Channelisation – Principle and design of intersections, grade separations and interchanges - Traffic signals – Saturation flow - Design of traffic signals and signal co-ordination (Problems) - Signal phasing and timing diagrams - Traffic control aids and street furniture, street lighting, computer applications in signal design.

UNIT-V

TRAFFIC AND ENVIRONMENT : Detrimental effect of traffic on environment – Air pollution – Pollutants due to traffic – Measures to reduce air pollution due to traffic - Noise pollution – Measures to reduce noise pollution.

UNIT-VI

TRAFFIC SIGNS AND ROAD MARKINGS : Types of traffic signs - Cautionary, regulatory and informative signs - Specifications - Pavement markings - Types of markings – Lane markings and object markings - Standards and specifications for road markings.

UNIT-VII

HIGHWAY SAFETY: Problem of highway safety – Types of road accidents - Causes – Engineering measures to reduce accidents- Enforcement measures – Educational measures - Road safety audit - Principles of road safety audit.

UNIT-VIII

TRAFFIC MANAGEMENT : Traffic management - Transportation system management (TSM) - Travel demand management (TDM) - Traffic forecasting techniques, restrictions on turning movements - Oneway Streets - Traffic segregation - Traffic calming - Tidal flow operations - Exclusive bus lanes - Introduction to intelligent transportation system (ITS).

TEXT BOOKS

1. Kadiyali L R, *Traffic Engineering and Transport Planning,* 7th Edition, Khanna Technical Publications, Delhi, 2010.
2. Khanna K and Justo C E G, *Highway Engineering,* 8th Edition, Nem Chand & Bros, Roorkee, 2009.

REFERENCES

1. *Indian Roads Congress (IRC) Specifications: Guidelines and Special Publications on Traffic Planning and Management.*

2. *Guidelines of Ministry of Road Transport and Highways,* Government of India.
3. Subhash C. Saxena, *A Course in Traffic Planning and Design,* Dhanpat Rai Publications, New Delhi, 1989.
4. C. JotinKhisty and B.KentLall, *Transportation Engineering – An Introduction,* Prentice Hall of India Pvt. Ltd., 2006.
5. ParthaChakroborthy and Animesh Das, *Principles of Transportation Engineering,* Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
6. C.S. Papacostas and P.D. Prevedouros, *Transportation Engineering and Planning,* Prentice Hall of India Pvt. Ltd., 2006.
7. Mannering and Kilareski, *Highway Engineering and Traffic Analysis,* John Wiley Publications, 1990.

IV B.Tech. I Semester

10BT70107 : **DESIGN AND DRAWING OF IRRIGATION STRUCTURES (Elective)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Water Resources Engineering

Course Description: Design and drawing of surplus weir, tank sluice with tower head, trapezoidal notch fall, canal regulator, type III siphon aqueduct and sloping glacis weir.

Course Objectives:

- To impart the knowledge of irrigation systems
- To develop skills in drawing various irrigation structures.
- To apply the principles of flow in the design of structures.
- To get hands on experience in the design and drawing of irrigation structures.

Course Outcomes:

- Apply the principles of science and mathematics in the design of irrigation structures.
- Identify the assumptions involved in the design of irrigation structures
- Design and develop an irrigation structure as per the suitability of a site.
- Interpret the data of a given site to design an irrigation structure.
- Use modern software in the design of a structure.
- Provide solutions to society by designing different irrigation structures.
- Follow ethics in the design and development of an irrigation structure.
- Engage in learning and modifications required for design of structures as per the site selection.

Design and drawing of the following irrigation structures.

1. Surplus weir
2. Tank sluice with tower head
3. Trapezoidal notch fall
4. Canal regulator
5. Type III Siphon aqueduct.
6. Sloping glacis weir

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS

1. C. Satyanarayana Murthy, *Design of Minor Irrigation and Canal Structures,* Wiley Eastern Ltd.

REFERENCES

1. S.K. Garg, *Irrigation Engineering and Hydraulic Structures*, 23rd Edition, Standard Book House, 2010.
2. B.C. Punmia, Pande B.B. Lal, Ashok Kumar Jain and Arun Kumar Jain, *Irrigation and Water Power Engineering*, 16th Edition, Laxmi Publications, 2011

IV B.Tech. I Semester
10BT70111 **: GROUND IMPROVEMENT TECHNIQUES**
(Elective)

Internal Marks	**External Marks**	**Total**	**L**	**T**	**P**	**C**
30	**70**	**100**	**4**	**1**	**-**	**4**

Prerequisites: Soil Mechanics and Foundation Engineering

Course Description: Need and objectives; identification of probalamatic soils; ground improvement techniques; densification in granular soils; densification in cohesive soils; soil stabilisation; confinement; reinforced earth; geosynthetics; improvement of expansive soils

Course Objectives:

- To introduce the fundamental concepts of various strengthening methods of a soil.
- To develop skills on the stabilization methods of soils using different admixtures.
- To apply geosynthetics in ground improvement.
- To suggest suitable ground improvement techniques for different soils.

Course Outcomes:

Student will be able to

- Identify basic deficiencies of various soil deposits
- Decide various methods of improving the soil stability
- Implement techniques of ground improvement.
- Use admixtures in stabilizing the soil.
- Test the soil and apply geosynthetics to carryout separation, filtration and drainage.

UNIT – I

GROUND IMPROVEMENT : Need and objectives - Identification of problematic soils - Mechanical, hydraulic, physico-chemical, electrical, thermal and strengthening methods - Selection of suitable ground improvement technique based on soil condition.

UNIT – II

DENSIFICATION IN GRANULAR SOILS : Principles of soil densification – Properties of compacted soil - Compaction control tests - Specification of compaction requirements – In-situ densification methods in granular soils – Blasting, virbo-compaction, vibro-replacement, dynamic tamping, stone columns/granular piles and sand/gravel compaction piles - Vibration at the ground surface, impact at the ground surface - Vibration at depth, impact at depth.

UNIT - III

DENSIFICATION IN COHESIVE SOILS : In–situ densification methods in cohesive soils – Preloading or dewatering - Methods of de-watering - Sumps and interceptor ditches - Single, multi-stage well points - Vacuum well points - Horizontal wells - Foundation drains - Blanket drains - Criteria for selection of fill material around drains – Electroosmosis - Vertical drains – Sand drains, sand wick geodrains – Stone and lime columns – Thermal methods.

UNIT – IV

STABILISATION : Modification by admixtures - Shotcreting and guniting technology - Modification at depth by grouting - Methods of stabilization: mechanical, cement, lime, bituminous, chemical stabilization with calcium chloride, sodium silicate and gypsum - Objectives of grouting - Grouts and their properties - Grouting methods: ascending, descending and stage grouting - Hydraulic fracturing in soils and rocks - Post grout test.

UNIT –V

CONFINEMENT : In-situ ground reinforcement - Ground anchors – Rock bolting and soil nailing.

UNIT – VI

REINFORCED EARTH : Principles – Components of reinforced earth – Factors governing design of reinforced earth walls – Design principles of reinforced earth walls.

UNIT – VII

GEOSYNTHETICS : Properties – physical, mechanical, hydraulic, endurance, degradation, tests – Types: Geotextiles, geogrids, geomembranes etc. - Functions and applications - Design for drainage, separation, filtration, reinforcement, multiple functions.

UNIT - VIII

EXPANSIVE SOILS : Problems of expansive soils – Tests for identification – Methods of determination of swell pressure - Improvement of expansive soils – Foundation techniques in expansive soils – Underreamed piles.

TEXT BOOKS

1. Hausmann M.R., *Engineering Principles of Ground Modification,* International Edition, McGraw-Hill, 1990.
2. Purushotham Raj, P., *Ground Improvement Techniques,* 1st Edition, Laxmi Publications (P) Ltd., New Delhi, 2005.

REFERENCES

1. Moseley, M.P. and Kirsch. K., *Ground Improvement,* 2nd Revised Edition, Taylor Francis Ltd, United Kingdom, 2004.
2. Xanthakos P.P, Abramson, L.W and Bruce, D.A, *Ground Control and Improvement,* 1st Edition, John Wiley and Sons, New York, USA, 1994.
3. Koerner, R. M., *Designing with Geosynthetics,* 5th Edition, Prentice Hall Inc., New Jersey, USA, 2005.
4. Koerner, R.M., *Construction and Geotechnical Methods in Foundation Engineering,* International Edition, McGraw-Hill, 1984.
5. Jewell, R.A., *Soil Reinforcement with Geotextiles (Report),* CIRIA Special Publication, London, 1996.
6. Das, B. M., *Principles of Foundation Engineering,* 6th Edition, Cengage Learning India, New Delhi, 2007.

IV B.Tech. II Semester

10BT80103 **: WATERSHED MANAGEMENT (Elective)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Surveying and Hydrology

Course Description: Concept of watershed; need and objectives; characteristics of watershed; principles of erosion; measures to control erosion; water harvesting; land and ecosystem management; planning and administration

Course Objectives:

- To provide fundamentals of watershed management
- To apply the principles of erosion of land management and water harvesting
- To develop skills in farming, horticulture for sustainable agriculture
- To involve people for participating watershed management

Course Outcomes:

- Improve the selected watersheds with associated natural resources base.
- Develop and strengthen community based watershed management for sustainable growth
- Use modern tools for water harvesting and land management
- Assess water availability and suggest different water harvesting techniques
- Demonstrate the importance of watershed management and support participatory water management
- Forecast ethical issues involved in the watershed development
- Recognize the need for watershed development for sustainable development

UNIT-I

INTRODUCTION : Concept of watershed development t- Objectives of watershed development - Need for watershed development in India - Integrated and multidisciplinary approach for watershed management.

UNIT-II

CHARACTERISTICS OF WATERSHED : Size – Shape – Physiography– Slope – Climate – Drainage - Land use – Vegetation- Geology and soils - Hydrology and Hydrogeology - Socio-economic characteristics - Basic data on watersheds.

UNIT-III

PRINCIPLES OF EROSION : Types of erosion - Factors affecting erosion - Effects of erosion on land fertility and land capability - Estimation of soil loss due to erosion - Universal soil loss equation.

UNIT-IV

MEASURES TO CONTROL EROSION : Contour techniques – Ploughing – Furrowing – Trenching – Bunding – Terracing - Gully control - Rock fill dams - Brushwood dam - Gabion.

UNIT-V

WATER HARVESTING : Rainwater harvesting - Catchment harvesting - Harvesting structures - Soil moisture conservation - Check dams - Artificial recharge - Farm ponds - Percolation tanks.

UNIT-VI

LAND MANAGEMENT : Land use and land capability classification - Management of forest – Agricultural - Grassland and wild land - Reclamation of saline and alkaline soils.

UNIT-VII

ECOSYSTEM MANAGEMENT : Role of ecosystem - Crop husbandry- Soil enrichment - Inter, mixed and strip cropping - Cropping pattern- Sustainable agriculture - Bio-mass management - Dry land agriculture - Silvi pasture – Horticulture - Social forestry and afforestation.

UNIT-VIII

PLANNING AND ADMINISTRATION : Planning of watershed management activities - Peoples participation - Preparation of action plan - Administrative requirements.

TEXT BOOKS

1. JVS Murthy, *Watershed Management,* 2nd Edition, New Age International Publishers, 2009.
2. R. A. Wurbs and W.P. James, *Water Resource Engineering*, 1st Edition, PHI, 2001.

REFERENCES

1. V.V.N. Murthy, *Land and Water Management,* 4th Edition, Kalyani Publications, Punjab, 2008.
2. D.K. Majumdar, *Irrigation and Water Management,* 1st Edition, PHI, 2010.

IV B.Tech. II Semester

10BT80102 **: ADVANCED FOUNDATION ENGINEERING (Elective)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Foundation Engineering and RCCS

Course Description: Analysis and design of shallow foundations, piles, wells, sheet piles; foundations; foundations in problematic solis: CNS layer technique, lime column techniques, underreamed piles; marine substructures.

Course Objectives:

- To introduce the concept of sheet pile walls, under reamed piles, marine substructures and issues related to foundations.
- To build skills in understanding of soil behavior pertaining to different types of foundations.
- To apply various techniques used to reduce the expansiveness of soils.
- To design appropriate foundation system for any civil engineering project which is environmentally sustainable and economically viable.

Course Outcomes:

After the completion of the course, student can be able to

- Select the best foundation solution for different types of civil engineering problems.
- Analyze and design different types of foundations based on different ground conditions.
- Determine allowable bearing pressures using several theorems and to apply these pressures wherever necessary.
- Analyze and design sheet pile walls.
- Identify expansive soils and can select an appropriate method for controlling its swelling.
- Comprehend and utilize under-reamed pile foundations in expansive soils.

UNIT-I

SHALLOW FOUNDATIONS : Bearing capacity – Theories of Prandtl, Terzaghi, Meyerhof, Hansen, Skempton and Vesic – General, local and punching shear failure - Effects of size, depth and shape of footings, tilt and eccentricity of applied loads, water table, compressibility, non-homogeneity and anisotropy of soil - Bearing capacity of isolated footing resting on stratified soils - Button's theory and Siva Reddy analysis - Settlement of foundation: one, two and three dimensional theories.

UNIT-II

ANALYSIS AND STRUCTURAL DESIGN OF R.C.C. FOOTINGS :

Types of foundation – Analysis and structural design of R.C.C. isolated, strap footing, combined footing and mat foundation.

UNIT-III

PILE FOUNDATIONS : Bearing capacity of piles and pile groups – IS method – Settlement of piles – Negative skin friction – Lateral load resistance of individual piles and pile groups – Finite difference method - Non-dimensional method – Simple R.C.C. Design of pile.

UNIT – IV

WELL FOUNDATIONS: Shapes of Wells – Grip length and Bearing Capacity – Forces acting on well foundation – Banerjee's and Gangopadhyay's analysis – IRC method - Individual components of a Well – Sinking of Wells – Rectification of Tilts and Shifts.

UNIT – V

SHEET PILE WALLS: Sheet pile structures – cantilever sheet pile walls in granular soils and cohesive soils – Anchored Bulk head – Free earth supported method – Fixed earth support method – Lateral earth pressure on Braced sheet pile walls.

UNIT-VI

FOUNDATIONS IN PROBLEMATIC SOILS: Foundations in black cotton soils - basic foundation problems associated with black cotton soils - Lime column techniques – Principles and execution - Use of Cohesive Non Swelling (CNS) layer below shallow foundations.

UNIT-VII

DESIGN OF UNDERREAMED PILE FOUNDATIONS : Underreamed piles - principle of functioning of underreamed pile - Analysis and structural design of underreamed pile.

UNIT-VIII

MARINE SUBSTRUCTURES : Introduction - Type of marine structures - Breakwaters, wharves, piers, seawalls, docks, quay walls - Design loads - Wave action - Wave pressure on vertical wall - Ship impact on piled wharf structure - Design of rubble mount break water and wall type break water.

TEXT BOOKS

1. Shamsher Prakash, Gopal Ranjan and Swami Saran, *Analysis and Design of Foundations and Retaining Structures,* Sarita Publishers, Meerut, 1979.
2. P.C. Varghese, *Design of Reinforced Concrete Foundations,* 1st Edition, PHI Learning, New Delhi, 2009.

REFERENCES

1. Swami Saran, *Analysis and Design of Substructures – Limit State Design,* 2nd Edition, Oxford & IBH Publishing Company Pvt. Ltd., New Delhi, 2010.
2. Braja M. Das, *Principles of Foundation Engineering,* 6th Edition, Cengage Learning India, New Delhi, 2007.
3. Teng, W.C., *Foundation Engineering,* 1st Edition, Prentice Hall Inc., New Jersey, USA, 1962.
4. Peck, R.B., Hanson, W.E. and Thornburn, T. H., *Foundation Engineering,* 2nd Edition, Wiley Eastern Ltd., New York, 1980.
5. Bowles, J.E., *Foundation Analysis and Design,* 5th Edition, McGraw-Hill Publishing Company, New York, 2001.
6. C. Venkatramaiah, *Geotechnical Engineering,* 3rd Edition, New Age International Publishers, New Delhi, 2010.
7. V. N. S. Murthy, *Text Book of Soil Mechanics and Foundation Engineering,* 3rd Edition, CBS Publishers & Distributors (P) Ltd., New Delhi, 2010.

IV B.Tech. II Semester
10BT80106 **: PRESTRESSED CONCRETE (Elective)**

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Structural Analysis, Reinforced Cement Concrete Structures

Course Description: Historic development, principle, methods and losses of prestress; analysis and design of flexure, shear and end blocks; general design consideration of composite sections and deflections or prestressed concrete beams

Course Objectives:

- To introduce fundamental principles about the structural behavior and design criteria of Prestressed Concrete Structures.
- To analyze the Response of structures subjected to prestressing.
- To apply the principles of elastic design to various shaped sections.
- To imbibe the usage of prestressed concrete and its use

Course Outcomes:

- Analyze prestressed members under flexure and stresses.
- Design the prestressed members using elastic design members.
- Give vital conclusions on the usage of prestressed members to control deflections.

UNIT – I
PRINCIPLES OF PRESTRESSING : Historic development – General principles of prestressing - Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel.

UNIT – II
METHODS OF PRESTRESSING : Methods and systems of prestressing - Pre-tensioning and post tensioning – Analysis of post tensioning - Different systems of prestressing - Hoyer system - Magnel system, Freyssinet system and Gifford-Udall system.

UNIT – III
LOSSES OF PRESTRESS : Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete - Shrinkage of concrete - Creep of concrete - Relaxation of steel - Slip in anchorage bending of member and frictional losses.

UNIT – IV
ANALYSIS OF SECTION FOR FLEXURE : Analysis of sections for flexure - Prestressed with straight, concentric, eccentric tendons, bent and parabolic tendons.

UNIT – V
DESIGN OF SECTIONS FOR FLEXURE AND SHEAR : Allowable stresses - Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure and shear – Kern lines, cable profile.

UNIT – VI

ANALYSIS OF END BLOCKS : Guyon's method and Mugnel method- Anchorage zone stresses – Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

UNIT – VII

COMPOSITE SECTION : Composite section - Analysis of stress – Differential shrinkage – General designs considerations.

UNIT – VIII

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS : Importance of control of deflections – Factors influencing deflections – Short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS

1. Krishna Raju, *Prestressed Concrete,* 4th Edition, Tata McGraw-Hill Publications, New Delhi, 2011.
2. N. Rajagopalan, *Prestressed Concrete,* 2nd Edition, Narosa Publications, New Delhi, 2010.

REFERENCES

1. Ramamrutham, *Prestressed Concrete,* 5thEdition, Dhanpat Rai Publications, New Delhi, , 2003.
2. T.Y. Lin and Ned H. Burns, *Design of Prestressed Concrete Structures,* 3rd Edition, John Wiley and Sons, 2010.

IS Codes

IS 1343 is to be permitted into the examination hall.

III B. Tech., I-Semester, EEE

10BT50201: POWER ELECTRONICS

L	T	P	C
4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Semiconductor Devices & Circuits of II B.Tech I –Semester and Semiconductor Devices & Circuits Lab of II B.Tech., II-Semester

COURSE DESCRIPTION:
Power semiconductor devices; commutation circuits; design of snubber circuit; Single phase and three phase controlled converters; AC voltage controllers, Cycloconverters; choppers and inverters

COURSE OUTCOMES: On successful completion of this course the students will be able to
1. demonstrate knowledge in
   - The characteristics of various power semiconductor devices, their ratings and protection.
   - Various triggering methods and commutation techniques
   - Operation of Line commutated and Force commutated converters
2. analyze the performance of different power converters subjected to various loads
3. design
   - Static and dynamic equalizing circuits
   - Device Protection circuits
   - Circuits to meet the desired specifications.
4. demonstrate problem solving skills in evaluating electrical parameters and different variables of various power electronic circuits.

DETAILED SYLLABUS:

UNIT–I: POWER SEMI CONDUCTOR DEVICES
Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics – Basic theory of operation of SCR – Static characteristics of SCR - Dynamic characteristics of SCR - Turn on methods for SCR

UNIT–II: DEVICES AND COMMUTATION CIRCUITS
Two transistor analogy – SCR – R and RC Triggering - UJT firing circuit –Series and parallel connections of SCRs-Numerical problems–Specifications and Ratings of SCRs- Turn off(Commutation) methods for SCR

UNIT–III: PROTECTION CIRCUITS
Protection against dv/dt & over voltages-Snubber circuit-Design of Snubber circuit- Numerical Problems-Metal Oxide Varistors-Improving dv/dt rating with the help of Cathode short di/dt Protection with the help of Inductor-over current Protection-Semiconductor Fuses-Cooling of Semiconductor devices-Types

UNIT–IV: SINGLE PHASE HALF & FULLY CONTROLLED CONVERTERS
Phase control technique – Single phase Line commutated converters – Mid point and Bridge connections – Half & Fully controlled converters with Resistive, RL loads and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters-Effect of Freewheeling Diode –Numerical problems

UNIT–V: THREE PHASE LINE COMMUTATED CONVERTERS
Three phase converters – Three pulse and six pulse converters – Mid point and bridge connections average load voltage With R and RL loads – Effect of Source inductance–Dual converters (both single phase and three phase) - Waveforms –Numerical Problems.

UNIT–VI: AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS
AC voltage controllers – Single phase two SCRs in anti-parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor –Numerical problems -Cyclo converters – Single phase mid-point cyclo converters with Resistive and inductive load

(Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms

UNIT–VII: CHOPPERS

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression Morgan's chopper – Jones' chopper–AC Chopper & their Waveforms

UNIT–VIII: INVERTERS

Inverters – Single phase inverter – Basic series inverter – Basic parallel inverter –Voltage Source Inverter & Current Source Inverter- Mc Murray and McMurray-Bedford inverters-Voltage control techniques for inverters Pulse width modulation techniques.

TEXT BOOKS:

1. M. D. Singh & K. B. Kanchandhani, *Power Electronics*, Tata McGraw – Hill Publishing Company, 1998.
2. P. C. Sen, *Power Electronics*, Tata Mc Graw-Hill Publishing Company, 2009.

REFERENCE BOOKS:

1. Vedam Subramanyam, *Power Electronics*, 3rd Edition, New Age International (P) Limited, 2008.
2. M. H. Rashid, *Power Electronics: Circuits, Devices and Applications*, 2nd edition, Prentice Hall of India, 1998.
3. G. K. Dubey, S. R. Doradla, A. Joshi and R. M. K. Sinha, *Thyristorised Power Controllers,* New Age International (P) Limited Publishers, 1996.
4. John G. Kassakian, Martin F. Schlecht and George C. Verghese, *Principles of Power Electronics*, Pearson, 2009.

III B. Tech., I-Semester, EEE

10BT50202: AC MACHINES

L	T	P	C
4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Transformers & Induction Machines of II B. Tech., I-Semester

COURSE DESCRIPTION:
Construction, operation, characteristics, regulation and parallel operation of Synchronous generator; Operation and circle diagram of Synchronous motor; Single phase induction motors, AC series motor, Universal motor; operation of special machines

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in:
   - construction details, working principle, characteristics and performance of a synchronous machine, single phase motors and special machines.
   - armature reaction, regulation and synchronization of alternator.
   - methods of Starting of synchronous motor and its performance evaluation using circle diagrams.
   - Parallel operation of alternators.
2. analyze the operation of synchronous and single phase machines for various operating conditions.
3. evaluate the performance and various parameters of synchronous machine.
4. identify a suitable machine for domestic and industrial applications.

DETAILED SYLLABUS:

UNIT–I: CONSTRUCTIONAL DETAILS AND PRINCIPLE OF OPERATION OF SYNCHRONOUS GENERATOR

Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E. M. F Equation - Problems.

UNIT-II: CHARACTERISTICS OF SYNCHRONOUS GENERATOR

Harmonics in generated e. m. f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics

UNIT–III: REGULATION OF SYNCHRONOUS GENERATOR

Regulation by synchronous impedance method, M. M. F. method, Z. P. F. method and A. S. A. methods – salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test)- Phasor diagrams – Regulation of salient pole alternators.

UNIT–IV: PARALLEL OPERATION OF SYNCHRONOUS GENERATOR

Synchronizing alternators with infinite bus bars – synchronizing power and torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactances

UNIT–V: SYNCHRONOUS MOTORS – PRINCIPLE OF OPERATION AND CIRCLE DIAGRAM.

Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed - circle diagram - Excitation and power circles – hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT–VI: SINGLE PHASE INDUCTION MOTORS

Single phase Motors: Single phase induction motor – Constructional features-Double revolving field theory – Elementary idea of cross-field theory – split-phase motors – shaded pole motor.

UNIT–VII: SINGLE PHASE MOTORS

Principle & performance of A. C. Series motor-Universal motor – Principle of permanent magnet and reluctance motors.

UNIT–VIII: SPECIAL MACHINES

Stepper motor – types of stepper motors - synchros – types of synchros- servo motors – DC servo motor – AC servo motors.

TEXT BOOKS

1. JB Gupta, *Theory and performance of Electrical Machines (DC machines, Poly phase circuits & AC machines) in SI Units*, 14th edition, S. K. KATARIA & Sons, New Delhi, 2006.
2. P. S. Bimbhra, *Electrical Machinery*, 7th edition, Khanna Publishers. Delhi, 2005.

REFERENCE BOOKS:

1. M. G. Say, *The Performance and Design of A. C. Machines*, 3rd edition, CBS publishers, New Delhi, 2002.
2. A. E. Fitzgerald, C. Kingsley and S. Umans, *Electric Machinery*, 6th edition, Mc Graw-Hill Companies, New Delhi, 2008.
3. Langsdorf, *Theory of Alternating Current Machinery*, 2nd edition, Tata Mc Graw-Hill, New Delhi, 2005.
4. I. J. Nagrath &D. P. Kothari, *Electric Machines*, 7th edition, Tata Mc Graw-Hill Publishers, 2005.

III B. Tech., I-Semester, EEE

10BT50203: ELECTRICAL POWER TRANSMISSION

L	T	P	C
4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Generation of Electrical Power of II B.Tech., II-Semester

COURSE DESCRIPTION:
Calculation of Transmission line parameters; classification and performance of transmission lines, corona; travelling wave phenomenon; Symmetrical component theory; Types of insulators; sag and tension calculations; underground cables

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on
   - transmission line configurations and their performance.
   - transients in transmission lines
   - insulation system for transmission system
   - concepts of corona, per unit system, symmetrical component theory
   - cables and their performance
2. analyze
   - the electrical and mechanical aspects of transmission lines.
   - the capacitance of cable for different configurations.
   - phasors using symmetrical component theory.
3. design of electrical, mechanical systems and insulators to improve the overall performance of transmission lines and cables.
4. demonstrate skills in
   - evaluating the parameters and performance of transmission lines and cables.
   - evaluating the electrical and mechanical aspects of transmission lines, cables and insulators.

DETAILED SYLLABUS:

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 and GMD, symmetrical and asymmetrical conductor configuration with and without transposition, numerical problems.
Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and double circuit lines, numerical problems.

UNIT-II: PERFORMANCE OF SHORT AND MEDIUM TRANSMISSION LINES

Classification of transmission lines- short, medium and long lines and their model representations-nominal T, nominal-pie and A, B, C, D constants for symmetrical and asymmetrical networks, numerical problems. Mathematical solutions to estimate regulation and efficiency of all types of lines- numerical problems

UNIT-III: PERFORMANCE OF LONG TRANSMISSION LINES& CORONA

Rigorous solution for long transmission lines- surge impedance and surge impedance loading of long lines, wave length and velocity of propagation of waves-numerical problems. Skin, Proximity and Ferranti effects-Corona- description of the phenomenon, factors affecting corona, critical voltages and power loss, radio interference- numerical problems.

UNIT-IV: POWER SYSTEM TRANSIENTS

Types of 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, lumped reactive junctions- Beweley’s Lattice diagram for all the cases mentioned above-numerical problems

UNIT-V: SYMMETRICAL COMPONENT THEORY AND ANALYSIS
Per Unit System Representation, Per Unit equivalent reactance network of a three phase Power System, Numerical Problems. Symmetrical Component Theory: Voltages, Currents and Impedances. Symmetrical Component Transformation - Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

UNIT-VI: OVER HEAD LINE INSULATORS
Line supports-different types-wooden, RCC poles and steel towers. Types of insulators, string efficiency and methods for improvement, numerical problems - Voltage distribution, calculation of string efficiency, capacitance grading and static shielding- numerical problems

UNIT-VII: SAG AND TENSION CALCULATIONS
Sag and Tension calculations with equal and unequal heights of towers, effect of wind and ice on weight of conductor, numerical problems- stringing chart and sag template and their applications, vibrations and dampers.

UNIT-VIII: UNDER GROUND CABLES
Types of cables, construction, types of insulating materials, calculations of insulation resistance and stress in insulation, numerical problems - Capacitance of single and 3-core belted cables, numerical problems. Grading of cables- capacitance grading, numerical problems, description of inter sheath grading.

TEXTBOOKS:
1. M. L. Soni, P. V. Gupta, V. S. Bhatnagar, A. Chakravarthy, A text *book on power system engineering*, DhanpatRai and Co Private Limited, 2007.
2. C. L. Wadhwa, *Electrical Power Systems*, 3rd edition, New Age International(P)Limited, publishers, 2005.

REFERENCES:
1. John J Grainger William D Stevenson, *Power System Analysis*, 4th edition, TMC Companies, 2003.
2. B. R. Gupta, *Power System Analysis and Design*, 3rd edition, Wheeler Publishers, 1999.
3. Hadi Saadat, *Power System Analysis*, 6th reprint, TMH Edition, 2005.
4. I. J. Nagrath and D. P. Kothari, *Modern Power System Analysis*, 3rd edition, Tata Mc Graw Hill, Sep 2003.

III B. Tech., II-Semester, EEE

10BT60201: UTILIZATION OF ELECTRICAL ENERGY

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: AC Machines and Transformers & AC Machines Lab of III B.Tech., I-Semester

COURSE DESCRIPTION:
Types and characteristics of electric drives; types of electric heating and welding; Fundamentals and various methods of Illumination; electric traction; significance of energy auditing and BEE standards

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge in
   - Different types of electric drives.
   - Methods of electric heating, welding and illumination.
   - control of traction motors
   - mechanics of traction system
   - concepts of energy auditing.
2. analyze
   - appropriate drive for the industrial purpose.
   - proper illumination strategy for good lighting system.
   - the traction system for better performance.
3. design illumination system for proper lighting
4. demonstrate skills in evaluating the illumination levels, performance of various electrical drives and traction effort.
5. apply suitable drive, heating, welding and illumination techniques for various societal needs .
6. Infer knowledge of BEE standards for utilization of electric power in compliance with environment and ethical code.

DETAILED SYLLABUS:

UNIT–I: ELECTRIC DRIVES
Type of electric drives - choice of motor - starting and running characteristics - speed control - Temperature rise - particular applications of electric drives - types of industrial loads - Continuous - intermittent and variable loads - load equalization.

UNIT–II: ELECTRIC HEATING
Advantages and methods of electric heating - resistance heating - induction heating and dielectric heating.

UNIT–III: ELECTRIC WELDING
Electric welding - resistance and arc welding - electric welding equipment - comparison between A. C. and D. C. Welding.

UNIT–IV: ILLUMINATION FUNDAMENTALS
Introduction - terms used in illumination - laws of illumination - polar curves – photometry - integrating sphere - sources of light.

UNIT–V: VARIOUS ILLUMINATION METHODS
Discharge lamps – mercury vapor and sodium vapor lamps – comparison between tungsten filament lamps and fluorescent tubes – compact fluorescent lamp - Basic principles of light control - Types and design of good lighting system and practice - flood lighting.

UNIT–VI: ELECTRIC TRACTION – I
System of electric traction and track electrification - Review of existing electric traction systems in India - Special features of traction motor - methods of electric braking-plugging - rheostatic braking - regenerative braking.

UNIT–VII: ELECTRIC TRACTION – II

Mechanics of train movement - Speed-time curves for different services – trapezoidal and quadrilateral speed time curves - 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 - coefficient of adhesion

UNIT–VIII: ENERGY AUDITING

Cost benefit Analysis - energy auditing - public supply for reduction of energy costs – Bureau of energy efficiency (BEE) standards for electrical appliances - electronic chokes - smart meters - energy efficient motors: factors affecting efficiency - loss distribution - constructional details and characteristics.

TEXT BOOKS:

1. J. B. Gupta, *Utilization of Electrical Power and Electric Traction*, S. K. Kataria and Sons, 2002.
2. B. R. Gupta , *Generation of Electrical Energy*, Eurasia publishing House (P) Ltd , New Delhi, 2003.

REFERENCE BOOKS:

1. N. V. Suryanarayana, *Utilization of Electrical Power including Electric drives and Electric traction*, New Age International (P) Limited, Publishers, 1996.
2. C. L. Wadhwa, *Generation, Distribution utilization of Electrical Energy*, New Age International Pvt . Ltd, 2003.
3. E. Openshaw Taylor, *Utilization of Electric Energy*, Orient Longman, 1971
4. John Andreas, *Energy – efficient electric motors,* marcel Dekker, INC, New York.
5. http: //www. bee-india. nic. in
6. http: //www. meteringindia. com

III B. Tech., II-Semester, EEE

10BT60202: POWER SEMICONDUCTOR DRIVES

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power Electronics and AC Machines of III B.Tech., I-Semester

COURSE DESCRIPTION:
Single phase and three phase controlled rectifier fed drives; four quadrant operation of DC motors ; chopper fed drives; Induction motor control from stator side and rotor side; synchronous motor control by VSI and CSI Cycloconverters; control of special motor drives

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on the
   - process of controlling DC & AC motor drives in various quadrant operations using Power modulators.
   - driver circuits for the control and operation of special machines, solar and battery powered drives.
2. analyze the speed–Torque characteristics of DC & AC motor drives using conventional and static methods.
3. design controllers for various quadrant operations using Power modulators.
4. demonstrate skills in evaluating control parameters of motor drives to meet the desired specifications.
5. apply suitable power modulator for control of DC and AC motor and other special motor drives.

DETAILED SYLLABUS:

UNIT–I: CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS
Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to d. c separately excited and d. c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed d. c motors.

UNIT-II: CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS
Three phase semi and fully controlled converters connected to d. c separately excited and d. c series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

UNIT–III: FOUR QUADRANT OPERATION OF DC DRIVES
Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations - Four quadrant operation of D. C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT-IV: CONTROL OF DC MOTORS BY CHOPPERS
Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continues current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed d. c Motors – Closed Loop operation (Block Diagram Only).

UNIT–V: CONTROL OF INDUCTION MOTOR THROUGH STATOR VOLTAGE & STATOR FREQUENCY
Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers- Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters- PWM control–Speed torque characteristics – numerical problems on induction motor drives.

UNIT–VI: CONTROL OF INDUCTION MOTOR FROM ROTOR SIDE
Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages - applications – problems– Closed loop operation of induction motor drives (Block Diagram Only)

UNIT–VII: CONTROL OF SYNCHRONOUS MOTORS
Separate control &self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics –Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only).

UNIT–VIII: Control of SPECIAL MOTOR DRIVES

Stepper Motors-Drive circuits for Stepper Motors. Switched Reluctance Motor-Operation & Control requirements - Converter circuits-Modes operation - Solar & Battery powered Drives-Solar panels-Motors suitable for pump drives-Battery powered Drives.

TEXT BOOKS:

1. G K Dubey, *Fundamentals of Electric Drives,* Narosa Publications.
2. M. H. Rashid, *Power Electronic Circuits, Devices and applications*, Prentice Hall of India.

REFERENCE BOOKS:

1. Dr. S. Sivanagaraju, M. Balasubba Reddy & A. Mallikarjuna Prasad, *Power Semiconductor Drives,* Prentice Hall India, 2009.
2. B. K. Bose, *Modern Power Electronics and AC Drives*, Prentice Hall of India
3. Vedam Subramanyam, *Thyristor Control of Electric drives*, Tata McGraw Hill Publications.
4. MD Singh and K B Khanchandani, *Power Electronics*, Tata McGraw-Hill Publishing Company, 1998.

IV B. Tech., I-Semester, EEE

10BT70201: SWITCHGEAR AND PROTECTION

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Power Transmission and Transformers and AC Machines Lab of III B.Tech., I-Semester

COURSE DESCRIPTION:
Symmetrical fault analysis; types of fuses, circuit breakers and relays; static and microprocessor based relays; protection of generators, transformers, feeders and busbars; Insulation Coordination-Basic Impulse Level; protection against over voltages; methods of neutral grounding

COURSE OUTCOMES: On completion of this course, a successful student will be able to
1. demonstrate knowledge in
   - short circuit studies.
   - operation of various protective devices.
   - protection principles for power system components.
2. analyze
   - fault level for different faults
   - operating aspects of protective devices
   - different grounding methods for protection
3. design of proper protection schemes for different power system components.
4. demonstrate skills to evaluate
   - operating parameters of various protecting devices
   - settings of protection devices in different protection schemes.

DETAILED SYLLABUS:

UNIT-I: SHORT CIRCUIT ANALYSIS
Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels-Numerical Problems. Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

UNIT-II: FUSES & CIRCUIT BREAKERS
Fuses—Types, ratings-Isolators-Circuit Breakers: Elementary principles of arc interruption, recovery, Restriking voltage-Restriking phenomenon Average and Maximum Rate Rise of Restriking Voltage-current chopping and resistance switching-construction and principle of Minimum Oil Circuit Breaker, Air Blast circuit breaker, Vacuum circuit breaker and SF_6 circuit breaker Circuit Breaker ratings & specifications-Auto reclosures

UNIT-III: ELECTROMAGNETIC RELAYS
Basic requirements of Relays-Types of Relays based on applications-constructional details of –attracted armature, balanced beam, induction type relays-differential relays and biased differential relays-universal torque equation-characteristics of over current, directional and distance relays (R-X).

UNIT-IV: STATIC AND MICROPROCESSOR BASED RELAYS
Static relays- Advantages and disadvantages- basic requirements of static relays - definite time, inverse and IDMT static relays- comparators-Amplitude and Phase comparators, Microprocessor based Relays- Advantages and Disadvantages- Block diagram for Over current (Definite, Inverse and IDMT) and Distance relays and their Flow Charts.

UNIT-V: PROTECTIONOF GENERATORS AND TRANSFORMERS
Protection of Generators- Differential protection-Restricted Earth fault protection and inter turn fault protection-Rotor fault protection - numerical problems on % winding unprotected. Transformer Protection-Differential Protection-percentage differential protection, Buchholz relay protection - numerical problems on design of CT's ratio

UNIT-VI: PROTECTION OF FEEDERS AND TRANSMISSION LINES
Protection of Feeder (Radial and Ring main) using over current Relays. Protection of transmission line- 3-Zone protection using Distance Relays. Carrier current protection. Protection of Bus bars.

UNIT-VII: NEUTRAL GROUNDING
Grounded and Ungrounded Systems - Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance and Peterson coil grounding- Arcing Grounds and Grounding Practices.
Applications of Reactors-Numerical Problems

UNIT-VIII: PROTECTION AGAINST OVER VOLTAGES
Generation of over voltages in power systems-protection against lightning over voltages-Valve type and Zinc-Oxide lighting Arresters- Insulation Coordination-Basic Impulse Level.

TEXTBOOKS:

1. Sunil S Rao, *Switchgear and Protection*, 11th edition, Khanna Publishers, 2005.
2. Badri Ram, D. N. Viswakarma, *Power system Protection and Switchgear*, 18th reprint, Tata McGraw Hill Publications, 2005.

REFERENCES:

1. C. L. Wadhwa, *Electrical Power systems*, 3rd edition, New Age International (P) Limited, Publishers, 2005.
2. B. L. Soni, Gupta, Bhatnagar, Chakrabarthy, *A text book on power system Engineering*, Dhanpat Rai & Co, 2007.
3. B. Ravindranath, M. Chander, *Power system Protection and Switchgear*, 1st edition, New Age International (P) Limited, Publishers, 2007.
4. T. S. Madhava Rao, *Power System Protection: Static Relays*, 2nd edition, TATA Mc Graw Hill inc., US 2004.

IV B. Tech., I-Semester, EEE

10BT70202: POWER SYSTEM OPERATION AND CONTROL

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Special Functions and Complex Analysis of II B.Tech., I-Semester, Generation of Electrical Power of II B.Tech., II-Semester and Control Systems of III B.Tech., I-Semester

COURSE DESCRIPTION:
Optimal operation of Generators in Thermal Power Stations; Optimum generation allocation; Optimal Scheduling of Hydrothermal System; modelling of turbine, generator and governor; single and two area frequency control; reactive power control; restructuring of power systems

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. Gain knowledge in:
   - Characteristics of Thermal and Hydro units for their optimal operation.
   - Modelling of generator, turbine and speed governors in power systems.
   - Load frequency control of single area and two area systems.
   - Significance of reactive power and its compensation in transmission lines.
   - Identifying key issues in deregulation of power system restructuring.
2. Analyze
   - the economic operation criteria for thermal and hydro-thermal units with and without losses.
   - a suitable controller for improving LFC dynamics in single and two area power system.
   - a suitable compensating strategy for reactive power management in transmission lines.
3. Design suitable controllers for LFC in 1-area and 2-area systems.
4. Acquire skills in
   - Scheduling of Thermal and Hydro-thermal units for optimal operation.
   - Evaluating the steady state frequency deviations for a load disturbance in single and two area power system.
   - Evaluating the proper ratings and settings of compensating devices.

DETAILED SYLLABUS:

UNIT-I: ECONOMIC OPERATION OF POWER SYSTEMS-I
Optimal operation of Generators in Thermal Power Stations, Characteristics of Thermal Plants-heat rate curve-Incremental fuel and Production costs, Input-Output characteristics, Optimum allocation with line losses neglected.

UNIT-II: ECONOMIC OPERATION OF POWER SYSTEMS-II
Optimum generation allocation including the effect of transmission losses-Loss Coefficients, General transmission line loss formula

UNIT-III: HYDROTHERMAL SCHEDULING
Optimal Scheduling of Hydrothermal System: Hydro electric power plant models, Scheduling problems- Short term hydro-thermal scheduling problem

UNIT-IV: MODELLING OF TURBINE, GENERATOR AND GOVERNOR
Modelling of Turbine: First order Turbine model, Block diagram representation of Steam Turbines and Approximate Linear Models - Modelling of Generator (Steady State and Transient Models): Description of Simplified Network Model of a Synchronous Machine (Classical Model), Description of Swing Equation(No Derivation)and State Space II-Order Mathematical Model of Synchronous Machine.
Modelling of Governor: Mathematical Modelling of Speed Governing System- Derivation of small signal transfer function-Block Diagram

UNIT-V: SINGLE AREA LOAD FREQUENCY CONTROL
Necessity of keeping frequency constant - Definition of control area-Block diagram representation of an isolated power system-Steady state response (controlled and uncontrolled case) - Dynamic response

(uncontrolled case) - Proportional plus Integral Control of single area and its block diagram representation of single area system, steady state response-Load Frequency Control and Economic Dispatch Control.

UNIT-VI: TWO AREA LOAD FREQUENCY CONTROL
Load frequency control of two area system- uncontrolled and controlled case, tie-line bias control.

UNIT-VII: REACTIVE POWER-VOLTAGE CONTROL
Overview of Reactive Power Control-Typical Excitation scheme, generation and absorption of reactive power: relation between voltage, power and reactive power, methods of voltage control in transmission system- advantages and disadvantages of different types of compensating equipment for transmission systems.

UNIT-VIII: POWER SYSTEM RESTRUCTURING
Introduction – Need for de regulation – motivation for power system restructuring – key issues in deregulation.

TEXT BOOKS:

1. C. L. Wadhwa, *Electrical Power Systems*, 3rd Edition, Newage International.
2. I. J. Nagrath & D. P. Kothari, *Modern Power System Analysis*, 2nd Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. S. N. Singh, *Electric Power Generation, transmission and Distribution*, 2nd Edition, Prentice Hall India.
2. A. Chakravarthi and S. Halder, *Power System Analysis Operation and Control*, 3rd Edition, Prentice Hall India.
3. Hadi Saadat, *Power System Analysis*, TMH edition, 2004.

IV B. Tech., I-Semester, EEE

10BT70203: POWER SYSTEM ANALYSIS

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Special Functions and Complex Analysis of II B.Tech., I-Semester and Switchgear and Protection of IV B.Tech., I-Semester

COURSE DESCRIPTION:
Representation of power system elements; Graph theory; formation of Y bus and Z bus of a Power System; power flow studies by various methods; three phase balance and unbalanced network elements; fault analysis; steady state and transient stability analysis of a power system.

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge in:
   - the formation of various network matrices for a power system network.
   - load flow studies.
   - concepts of power system stability.
2. analyze
   - the power flows and losses in the power system network using load flow analysis for different conditions.
   - the stability of the system for different loading and faulted conditions.
   - fault level for various faults.
3. demonstrate skills in evaluating
   - various network matrices.
   - the load flow solution for a power system network for different conditions.
   - the various stability limits for different conditions.

DETAILED SYLLABUS:

UNIT–I: POWER SYSTEM NETWORK MATRICES-I

Representation of Power system elements, Essential characteristics of a good Algorithm, Steps involved in solving a problem using Digital computer - Graph Theory: Definitions, Bus Incidence Matrix, Y_{bus} formation by Direct and Singular Transformation Methods, Numerical Problems.

UNIT–II: POWER SYSTEM NETWORK MATRICES-II

Formation of Z_{Bus}: Partial network, Algorithm for the Modification of Z_{Bus} Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems). - Modification of Z_{Bus} for the changes in network (Problems)

UNIT–III: POWER FLOW STUDIES-I

Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses). Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

UNIT–IV: POWER FLOW STUDIES-II

Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods. - Comparison of Different Methods – DC load Flow

UNIT–V: THREE PHASE NETWORK MODEL

Three phase elements – rotating, stationery elements - three phase balanced network elements – symmetrical components transformation matrices – three phase unbalanced network elements.

UNIT–VI: FAULT ANALYSIS USING Z_{BUS}

Symmetrical and unsymmetrical fault analysis using Z_{BUS} and numerical problems.

UNIT–VII: POWER SYSTEM STEADY STATE STABILITY ANALYSIS

Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

UNIT–VIII: POWER SYSTEM TRANSIENT STATE STABILITY ANALYSIS

Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation - Solution of Swing equation by point by point method - Methods to improve Stability - Application of Auto Reclosing and Fast Operating Circuit Breakers.

TEXT BOOKS:

1. Stagg El – Abiad & Stags, *Computer Methods in Power Systems*, Mc Graw-hill Edition.
2. I. J. Nagrath & D. P. Kothari, *Modern Power system Analysis,* 2nd edition, Tata McGraw-Hill Publishing Company.
3. B. R. Gupta, *Power System Analysis and Design*, 6th Revised edition, S. Chand & Co, 2010.

REFERENCE BOOKS:

1. Grainger and Stevenson, *Power System Analysis*, Tata McGraw Hill. 2003.
2. M A Pai, *Computer Techniques in Power System Analysis*, 2nd edition, Tata McGraw Hill 1994.
3. Dr. S. Sivanagaraju, B. V. Rami Reddy*, Electrical Power System Analysis,* revised edition Laxmi Publications, 2011.
4. Glovar and Sarma, *Power System Analysis*, Thomson Publishers, 2008.
5. Hadi Saadath, *Power System Analysis*, Tata McGraw Hill, 2004.

IV B. Tech., I-Semester, EEE

10BT70204: FLEXIBLE AC TRANSMISSION (ELECTIVE-II)

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power Electronics and AC Machines of III B.Tech., I-Semester and Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:
Electrical transmission networks: Conventional control methods; Principle of Reactive-Power Control; FACTS controllers and their advantages; transformer connections for various pulse operations: VSI and CSI; objective of shunt compensation; application of shunt compensators; need for series compensation; application of TCSC

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on:
   - different conventional and modern methods for real and reactive power control in transmission system.
   - importance and operation of various FACTS controllers in transmission system.
   - various transformer and converter configurations used for FACTS controllers.
2. Analyze different compensators for improving overall performance of the transmission system.
3. Extend the applications of FACTS devices to improve the overall performance of the transmission system.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO TRANSMISSION NETWORKS
Electrical transmission networks-Conventional control methods-Automatic Generation Control(AGC)-Excitation Control-Transformer Tap-Changer control-Phase Shifting Transformer- Problems of AC transmission systems-power flow in parallel paths and meshed system-factors limiting loading capability-stability consideration.

UNIT-II: REACTIVE POWER CONTROL
Reactive-Power Control in Electrical Power Transmission-Principles of Conventional Reactive-Power Compensators-Flexible ac Transmission Systems (FACTS) concepts-Importance of controllable parameters - Basic types of FACTS controllers-Advantages of FACTS technology.

UNIT-III: VOLTAGE & CURRENT SOURCE CONVERTERS
Voltage source converters: conversion principles-Transformer connections for 3, 6, 12, 24 and 48 pulse operation- Pulse width modulation converter-Current Source Converters

UNIT-IV: STATIC SHUNT COMPENSATORS
Static shunt compensation: Objectives of shunt compensation-mid point voltage regulation-voltage instability prevention-improvement of transient stability-Power oscillation damping.

UNIT-V: STATIC VAR COMPENSATORS
Methods of controllable var generation-variable impedance type static var generators- switching converter type var generators- hybrid var generators.

UNIT-VI: SVC & STATCOM-APPLICATIONS
Voltage Control by SVC – Influence of SVC on system voltage – Design of SVC voltage regulator – modelling of SVC for power flow and transient stability – principle of operation of STATCOM V-I Characteristics
Applications: Enhancement of Transient stability – steady state power transfer – prevention of voltage in stability.

UNIT-VII: STATIC SERIES COMPENSATOR
Static series compensators: concept of series capacitive compensation- improvement of transient stability-power oscillation damping.

UNIT-VIII: TCSC AND APPLICATIONS

Operation of the TCSC – different modes of operation – modelling of TCSC – variable reactance model – modelling of power flow and stability studies - Applications: Improvement of the system stability limit – enhancement of system damping.

TEXT BOOKS:

1. NarainG. Hingorani, LasziGyugyi, *Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems,* Wiley-IEEE Press, 1999.
2. R. Mohan Mathur and Rajiv K. Varma, *Thyristor based FACTS controllers for Electrical Transmission Systems,* Wiley-IEEE Press, 2002.

REFERENCE BOOKS:

1. Xiao-Ping, Rehtanz, Christian, Pal, Bikash, *Flexible AC Transmission Systems: Modeling and Control*, Springer Power Systems Series, 2006.
2. P. S. Kundur, *Power System Stability and Control*, McGraw-Hill Professional, 1994.
3. R. Padiyar, *Power System Dynamics: Stability and Control*, John Wiley, 1996.

IV B. Tech., I-Semester, EEE

10BT70205: HIGH VOLTAGE DC TRANSMISSION
(ELECTIVE-II)

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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power Electronics of III B.Tech., I-Semester and Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:
Need for HVDC Transmission: planning and modern trends; Analysis and Control of Power Converters; Harmonics: characteristics and design of Filters; sources of reactive power and control strategies; solution of AC-DC power flow; faults and protection of converters used in HVDC Transmission

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on:
   - different types of HVDC systems, various converter configurations and their control.
   - Effects of harmonics, faults and their control methods.
   - active and reactive power flow and their control.
2. analyze
   - different converter configurations.
   - Different control and protection strategies in HVDC system.
   - Power flow in HVDC system
3. demonstrate skill in designing filter circuits for minimizing harmonics.
4. demonstrate skills in evaluating parameters in HVDC system.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO HVDC TRANSMISSION
H. V. DC Transmission: Need for HVDC transmission- Apparatus required for HVDC Transmission system - Types of DC links- Comparison of AC & DC Transmission Systems-Applications of AC & DC Transmission system- Planning and modern trends in HVDC Transmission system.

UNIT-II: STATIC POWER CONVERTER ANALYSIS
Static Power Converters: Analysis of Graetz circuit – Characteristics of 6 Pulse & 12 Pulse converters-Communication process- Rectifier and inverter operation- Equivalent circuit for converter- special futures of converter transformers.

UNIT-III: HARMONICS
Generation of Harmonics –Characteristics harmonics- Calculation of AC Harmonics- Non- Characteristics harmonics-Effects of harmonics– Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics

UNIT–IV: FILTERS
Types of AC filters- Filter Characteristics- Design of Single tuned filters –Design of High pass filters, DC Filters.

UNIT-V: CONTROL OF HVDC CONVERTER AND SYSTEMS
Control of HVDC converter and systems: Principle of DC link control - constant current- Constant extinction angle and constant ignition angle control- Individual phase control and equidistant firing angle control.

UNIT-VI: REACTIVE POWER CONTROL IN HVDC
Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters – shunt capacitors-Synchronous Condensers-static Var systems.

UNIT-VII: POWER FLOW ANALYSIS IN AC/DC SYSTEMS
Modeling of DC links- DC networks, DC power flow control – P. U. System for DC quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method

UNIT-VIII: CONVERTER FAULTS AND PROTECTION
Converter faults – over voltages in converter station, protection against over current and over voltage in converter station -surge arresters - Protection of DC line-DC Breakers

TEXT BOOKS:
1. K. R. Padiyar, *High Voltage Direct current Transmission*, Wiely Eastern Ltd.
2. S Rao, *EHVAC, HVDC Transmission & Distribution Engineering*, Khanna Publishers, 2001.

REFERENCE BOOKS:
1. E. Uhlman, *Power Transmission by Direct Current* Springer Verlag, Berrlin.
2. J. Arillaga, *H. V. D. C. Transmission,* peter peregrilnus, Ltd., London UK, 1983.
3. E. W. Kimbark, *Direct current Transmission*, John Wiely & Sons, New York.

IV B. Tech., I-Semester, EEE

10BT70206: RENEWABLE ENERGY SOURCES
(ELECTIVE-II)

L	T	P	C
4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Generation of Electric Power of II B.Tech., II-Semester

COURSE DESCRIPTION:
Concept of solar radiation: Environmental impact of solar power; classification of solar energy collectors; different methods of solar energy storage and applications; wind energy, bio-mass energy, geo thermal and ocean energy; need for direct energy conversion

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. demonstrate knowledge on
    - generation of electrical energy from renewable energy sources and direct energy conversion
    - different conversion, energy storage methods and applications.
    - laws and effects in energy conversion.
2. analyze
    - various solar energy collectors
    - horizontal and vertical axis windmills
    - various bio mass digesters.
    - potential and conversion techniques for renewable energy sources.
3. demonstrate skills in evaluating Solar radiation and wind power
4. Industrial and residential application of renewable energy sources.
5. environmental impact of solar, wind, geothermal and ocean power

DETAILED SYLLABUS:

UNIT–I: PRINCIPLES OF SOLAR RADIATION
Role and potential of new and renewable source, the solar energy option, 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.

UNIT-II: SOLAR ENERGY COLLECTION
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors

UNIT-III: 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

UNIT-IV: WIND ENERGY
Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-V: BIO-MASS
Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I. C. Engine operation and economic aspects.

UNIT-VI: GEOTHERMAL ENERGY
Resources, types of wells, methods of harnessing the energy, potential in India

UNIT-VII: OCEAN ENERGY
OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-VIII: DIRECT ENERGY CONVERSION

Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, Seebeck, Peltier, Joul and Thomson effects. MHD generators - Principle. Fuel cells, principles, faraday's laws, thermodynamic aspects, selection of fuel and operation conditions

TEXT BOOKS:

1. G. D. Rai, *Non-Conventional Energy Sources*, Khanna Publishers, Delhi, 2007.
2. G. N. Tiwari and M. K. Ghosal, *Fundamentals of Renewable energy resources*, Narosa, New Delhi, 2007.

REFERENCE BOOKS:

1. Twidell & Wier, *Renewable Energy Resources*, CRC Press(Taylor & Francis)
2. Ramesh & Kumar, *Renewable Energy Technologies*, Narosa.
3. K Mittal, *Non-Conventional Energy Systems*, Wheeler
4. D. P. Kothari, K. C. Singhal, *Renewable energy sources and emerging technologies*, Prentice Hall India.
5. G. D. Rai, *Solar Energy Utilization*, Khanna Publishers, Delhi, 2001.

IV B. Tech., II-Semester, EEE

10BT80201: EHVAC TRANSMISSION
(ELECTIVE-IV)

L	T	P	C
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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electromagnetic Fields of II B.Tech., II-Semester and Electrical Power Transmission of III B.Tech., I-Semester

COURSE DESCRIPTION:
Advantages and problems associated with EHVAC transmission; line inductance and capacitance calculations; introduction to electrostatics; corona effects: power loss, audible noise and radio interference; calculation of electrostatic field of EHVAC lines; shunt and series compensation; Design of EHV lines based on steady state and transient limits.

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - EHVAC conductor parameters, configurations, electrical and mechanical aspects for design and analysis.
   - Corona inference, effects and relevant parameters in EHVAC systems.
   - Electrostatic field interference and effects.
   - Voltage control methods in EHVAC system.
2. analyze
   - various electrical parameters of different conductor configurations.
   - various parameters of corona phenomenon in EHVAC system.
3. demonstrate skill in design of EHV lines and cables based on steady state and transient limits.
4. demonstrate skills in evaluating various electrical and relevant parameters of different conductor configurations in EHVAC system.

DETAILED SYLLABUS:

UNIT–I: PRELIMINARIES
Necessity of EHV AC transmission advantages and problems-power handling capacity and line losses-mechanical considerations - resistance of conductors - properties of bundled conductors - bundle spacing and bundle radius- Examples.

UNIT–II: LINE AND GROUND REACTIVE PARAMETERS
Line inductance and capacitances - sequence inductances and capacitances - modes of propagation - ground return – Examples

UNIT–III: VOLTAGE GRADIENTS OF CONDUCTORS
Electrostatics - field of sphere gap - field of line changes and properties - charge - potential relations for multi-conductors - surface voltage gradient on conductors - distribution of voltage gradient on sub-conductors of bundle - Examples.

UNIT–IV: CORONA EFFECTS - I
Power loss and audible noise (AN) - corona loss formulae - charge voltage diagram - generation, characteristics - limits and measurements of AN - relation between 1-phase and 3-phase AN levels - Examples.

UNIT–V: CORONA EFFECTS - II
Radio interference (RI) - corona pulses generation, properties, limits - frequency spectrum - modes of propagation - excitation function - measurement of RI, RIV and excitation functions - Examples.

UNIT–VI: ELECTRO STATIC FIELD
Electrostatic field: calculation of electrostatic field of EHV/AC lines - effect on humans, animals and plants - electrostatic induction in unenergised circuit of double-circuit line - electromagnetic interference-Examples.

UNIT–VII: POWER FREQUENCY VOLTAGE CONTROL AND OVER VOLTAGES IN EHV LINES

No load voltage – charging currents at power frequency - voltage control – shunt and series compensation – static VAR compensation.

UNIT–VIII: DESIGN OF EHV LINES AND EHV CABLES

Design of EHV lines based on steady state and transient limits. EHV cables and their characteristics

TEXT BOOK:

1. Rakosh Das Begamudre, *Extra High Voltage AC Transmission Engineering*, 3rd Edition, New Age International Pvt. Ltd, 2006.

REFERENCE BOOKS:

1. Edison Electric Institution (GEC), *EHV Transmission line reference Book*, Edison House, 1986.
2. S. Rao, *EHVAC, HVDC Transmission and Distribution Engineering*, Khanna Publications, 2001.

IV B. Tech., II-Semester, EEE

L	T	P	C
4	1	-	4

10BT80202: DISTRIBUTION OF ELECTRICAL POWER (ELECTIVE-IV)

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Power Transmission of III B.Tech., I-Semester

COURSE DESCRIPTION:
Introduction to distribution systems; Design Considerations of Distribution Feeders; Voltage drop and power-loss calculations; protection of distribution systems; Different types of power capacitors and their effects; Quality of Service and Voltage Standards; Distribution System Planning-load forecasting;
Distribution System Automation

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - different types of loads and distribution feeders.
   - different parameters and protection schemes for distribution feeders
   - planning, operation and automation of distribution system.
2. analyze
   - different feeder configurations.
   - optimal capacitor placement.
   - voltage control in different feeder system.
   - techniques in planning and load forecasting.
3. demonstrate skill in
   - evaluating load parameters of different types of loads.
   - evaluating voltage drop, losses and fault levels in distribution system.
   - evaluating optimal capacitor size and location in distribution system.

DETAILED SYLLABUS:

UNIT–I: GENERAL CONCEPTS
Introduction to distribution systems, Load modelling and characteristics - Coincidence factor, contribution factor loss factor - Relationship between the load factor and loss factor - Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

UNIT-II: DISTRIBUTION FEEDERS
Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading, 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, manual methods of solution for radial networks, three phase balanced primary lines, non three-phase primary lines and load flow analysis of systems.

UNIT-IV: DISTRIBUTION SYSTEM PROTECTION
Types of common faults and procedure for fault calculation, Objectives of distribution system protection, Principle of operation of fuses, circuit reclosers, line sectionalizer and circuit breakers, Coordination of protective devices.

UNIT-V: APPLICATION OF CAPACITORS IN DISTRIBUTION SYSTEM
Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (fixed and switched) power factor correction, economic justification for capacitors, procedure to determine the optimum capacitor allocation.

UNIT-VI: VOLTAGE CONTROL

Quality of Service and Voltage Standards, voltage fluctuations, voltage control, feeder voltage regulators-effect of series capacitors - effect of AVB/AVR, line drop compensation**.**

UNIT-VII: DISTRIBUTION SYSTEM PLANNING

Distribution System Planning- Factors Affecting System Planning-Load forecasting- classification of Load forecasting-substation expansion, Distribution System Planning Models, Present Distribution System Planning Techniques

UNIT-VIII: AUTOMATION AND REAL TIME MANAGEMENT

Need for Distribution Automation, Distribution System Automation- Distribution Automation and Control Functions, Communication in distribution system, distribution management, functions of DMS - Distribution automation and management functionalities.

TEXT BOOKS:

1. Turan Gonen, *Electric Power Distribution System Engineering*, McGraw-Hill Book Company, 1986.
2. S. Sivanagaraju, V. Sankar, *Electrical Power Distribution and Automation*, Dhanpat Rai & Co, 2006.

REFERENCE BOOKS:

1. A. S. Pabla, *Electric Power Distribution,* 4th edition, Tata Mc Graw-Hill Publishing Company, 1997.
2. V. Kamaraju*, Electrical Power Distribution Systems*, Right Publishers, 2001.

IV B. Tech., II-Semester, EEE

10BT80203: HIGH VOLTAGE ENGINEERING
(ELECTIVE-IV)

L	T	P	C
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ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Electrical Measurements of II B.Tech., II-Semester and Switchgear and Protection of IV B.Tech., I-Semester

COURSE DESCRIPTION:
Types of insulators and their applications; breakdown process in solid, liquid and gaseous dielectrics; generation of high DC and AC voltages, impulse voltages and currents; measurement of high voltage, current, resistivity, dielectric constant and loss factor; testing of electrical apparatus.

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on:
   - various types of insulation and their behavior under voltage stress.
   - Generation and measurement of High voltages and currents.
   - testing of different electrical materials and apparatus.
2. analyze
   - breakdown phenomenon in different insulation systems.
   - different circuits for generation of high voltage and currents.
   - different methods of measuring high voltage quantities.
3. demonstrate skill in designing a circuit for measuring instruments.
4. demonstrate skills in evaluating
   - different parameters of insulation systems.
   - different parameters in measuring electrical quantities.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS
Electric field stresses, gas/vacuum as insulator, liquid dielectrics, solids and composites, estimation and control of electric stress. Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT-II: BREAKDOWN IN GASEOUS AND LIQUID DIELECTRICS
Gases as insulating media, collision process, ionization process, Townsend's criteria of breakdown in gases, and pachen's law. Liquid as insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

UNIT-III: BREAKDOWN IN SOLID DIELECTRICS
Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT-IV: GENERATION OF HIGH DC AND AC VOLTAGES
Generation of high DC voltages-rectifiers, voltage doubler circuits, voltage multiplier circuits-voltage drop and regulation, vandegraaf generators, electrostatic generators.
Generation of high alternating voltages-cascade transformers resonant transformers, tesla coil- numerical problems

UNIT-V: GENERATION OF IMPULSE VOLTAGES AND CURRENTS
Generation of impulse voltages-impulse wave shapes theoretical representation, wave shape control, Marx circuit, components of multi stage impulse generator. Generation of impulse currents-impulse current generator, tripping and control of impulse generator. -numerical problems.

UNIT-VI: MEASUREMENT OF HIGH VOLTAGES AND CURRENTS
Measurement of high direct current voltages, measurement of high voltages alternating and impulse, measurement of high currents-direct, alternating and impulse, oscilloscope for impulse voltage and current measurements.

UNIT-VII: NON-DESTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS
Measurement of DC resistivity, measurement of dielectric constant and loss factor, partial discharge measurements.

UNIT-VIII: HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS
Testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, testing of transformers, testing of surge arresters, radio interference measurements.

TEXT BOOKS:

1. M. S. Naidu and V. Kamaraju, *High Voltage Engineering,* 4th Edition, TMH Publications, 2008.
2. E. Kuffel, W. S. Zaengl, J. Kuffel, *High Voltage Engineering: Fundamentals* by Elsevier, 2nd Edition.

REFERENCE BOOKS:

1. C. L. Wadhwa, *High Voltage Engineering*, New Age Internationals (P) Limited, 1997.
2. Ravindra Arora and Wolfgang Mosch, *High Voltage Insulation Engineering*, New Age International (P) Limited, 1995.

IV B. Tech., II-Semester, EEE

10BT80204: RELIABILITY ENGINEERING AND APPLICATIONS TO POWER SYSTEMS
(ELECTIVE-IV)

L	T	P	C
4	1	-	4

ASSESSMENT:

MID EXAMINATION	ASSIGNMENT	END EXAMINATION	TOTAL
20 MARKS	10 MARKS	70 MARKS	100 MARKS

PREREQUISITES: Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:
Basic Probability Concept, Elements of probability theory; definition of reliability and component reliability, reliability functions; Reliability evaluation of Non - Series-Parallel Systems configurations; Introduction to Markov Process & Markov chain; Generation system model; Frequency and duration concepts; Basic indices - Customer oriented indices

COURSE OUTCOMES: on successful completion of the course a student will be able to

1. demonstrate knowledge on
    - elements of probability theory and probability distributions
    - types of failures, reliability block diagram reductions.
    - network reduction techniques and markov modelling
    - generation and load modelling
    - frequency and duration techniques
    - distribution system reliability indices
2. analyze
    - the various probability distributions and failure rates.
    - The network reduction techniques
    - LOLP, LOLE indices.
    - Methods for identifying critical components
    - cumulative probability cumulative frequencies
    - Customer, load and energy oriented indices
3. design
    - protection system for reliability enhancement
    - preventive and operational measures to improve system performance.
4. evaluate the power system networks using reliability concepts for adequacy and security
5. application of modern tools for power system reliability assessment.

DETAILED SYLLABUS:

UNIT–I: BASIC PROBABILITY THEORY

Probability Concept, Elements of probability theory, Random variables (Continuous, Discrete Variables), Density function and Distribution functions. Mean, SD, Variance. Probability Distributions: Exponential Distribution, Binomial Distribution, Poisson distribution, Normal Distribution, Weibull Distribution, Log Normal Distribution.

UNIT – II: RELIABILITY FUNCTIONS

Definition of reliability, Component Reliability, Hazard rate, derivation of the Reliability function in terms of the hazard rate, Bath Tub Curve. MTTF, MTTR, MTBF, types of Failures (early failures, chance failures and wear-out failures). Reliability Block Diagrams, Series and Parallel Systems. Series-Parallel Systems, Parallel - Series Systems.

UNIT–III: NETWORK MODELING

Reliability evaluation of Non - Series-Parallel Systems configurations. Cut-set, Basic Cut-set, Tie-set, and Basic Tie set, Minimal Cut-Set, Minimal Tie – set and Decomposition Methods. Deduction of the Minimal Cut sets from the Minimal paths-Stand by redundant Systems-Concept of redundancy, Perfect Switching, Imperfect Switching-Event trees

UNIT–IV: MARKOV MODELING

Introduction – Markov Process & Markov chain - STPM - Time Dependant probability - functions - Evaluating limiting state probabilities - Markov process – one component repairable model -Two component repairable model - Three component repairable model

UNIT–V: GENERATION SYSTEM RELIABILITY ANALYSIS

Introduction – Generation system model - Identical units- determination of capacity outage probability table - Determination of transitional rates -Non-Identical units- determination of capacity outage probability table - Reducing the states by Combining equal capacity states - Determination of transitional rates -Sequential addition method - Recursive relation for unit addition, unit removal - LOLP , LOLE determination .

UNIT–VI: FREQUENCY & DURATION TECHNIQUES

Frequency and duration concepts - Two components repairable model (with identical components) - Evaluation of cumulative probability cumulative frequency - Equivalent transition rates

UNIT–VII: COMPOSITE SYSTEM RELIABILITY ANALYSIS

Two level representation of daily load modeling - Merging of generation and load models – evaluation of probabilities, transitional rates-Decomposition method– Weather effects on transmission lines-circuit breaker model

UNIT–VIII: DISTRIBUTION SYSTEM & RELIABILITY ANALYSIS

Basic indices - Customer oriented indices - Load and energy indices - Radial networks – problems

TEXT BOOKS:

1. Roy Billinton and Ronald N Allen, *Reliability Evaluation of Engineering Systems*, Plenum press, New York and London (BS Publications Revised edition), 2007.
2. Roy Billinton and Ronald N Allen, *Reliability Evaluation of Power Systems,* 2nd Edition, Plenum press, New York and London (BS Publications Revised edition), 2007.

REFERENCE BOOKS:

1. Charles E. Ebeling, *An Introduction to Reliability and Maintainability Engineering*, TATA Mc Graw – Hill Edition, 2000.
2. LS Sainath, *Reliability Engineering*, 3rd Edition, Affiliated East West Pvt. Ltd., 1991.
3. Balaguru Swamy, *Reliability Engineering*. TATA Mc Graw - Hill – Edition. 1984.

III B.Tech. I Semester

(10BT50301) **THERMAL ENGINEERING – II**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*-*	*4*

PRE-REQUISITES:

Engineering Thermodynamics, Thermal Engineering-I

COURSE DESCRIPTION:

Concepts of Rankine cycle; Several aspects such as steam and its properties; Various boiler mountings and accessories; Draught and performance criteria of boilers; Characteristics of flow through nozzle; Steam turbine; Condensers; Introduction to gas turbines and jet propulsion.

CORSE OUTCOMES:

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

- *CO1. Apply the knowledge of Thermal Science, and Engineering fundamentals to the solution of Thermal Power Engineering problems.*
- *CO2. Conduct an elementary energy audit and develop heat balance sheet for boilers, turbines and such thermal engineering equipment.*
- *CO3. Develop preliminary mathematical models for selecting thermal systems and provide data for further design.*
- *CO4. Identify various components in select thermal engineering setups and troubleshoot a problem.*

UNIT – I: BASIC CONCEPTS

Rankine cycle - Schematic layout, Thermodynamic analysis, Concept of mean temperature of heat addition, Methods to improve cycle performance – Regeneration – Reheating.

UNIT – II: BOILERS

Classification - working of fire tube boilers-Lancashire, Locomotive boilers, Water tube boilers-Babcock & Wilcox, Bent tube boilers–Mountings-Water level indicator, Pressure gauge, Fusible plug, Blow-off cock and accessories – 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 draught.

UNIT – III: STEAM NOZZLES

Function of nozzle – applications - types, Flow through nozzles, Thermodynamic analysis – assumptions -velocity of nozzle at exit-Ideal and actual expansion in nozzle, Velocity coefficient, Condition for maximum discharge, Critical pressure ratio.

Criteria for design of nozzle shape: Super saturated flow-its effects, degree of super saturation and degree of under cooling - Wilson line –shock at the exit.

UNIT – IV: IMPULSE TURBINE

Mechanical details – velocity diagram – effect of friction – power developed, Axial thrust, blade or diagram efficiency – condition for maximum efficiency. De-Laval Turbine - its features, Methods to reduce rotor speed-Velocity compounding and pressure compounding, Velocity and Pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine, Governing of impulse turbine.

UNIT – V: 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, Governing of reaction turbine.

UNIT – VI: STEAM CONDENSERS
Requirements of steam condensing plant, Rare fraction – classification of condensers – working principle of different types – jet, Evaporative and surface condensers – vacuum efficiency and condenser efficiency – air leakage, Sources and its effects, Air pump-cooling water requirement.

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UNIT – VII: 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, Brief concept about combustion chambers and turbines of gas turbine plant.

UNIT – VIII: JET PROPULSION
Principle of operation –classification of jet propulsive engines – turbo jet, Turbo prop, Pulse jet –working Principles with schematic diagrams and representation on t-s diagram - thrust, Thrust Power and propulsion efficiency, Thrust augmentation techniques.
Rocket propulsion: Application – working principle – classification – propellant type – thrust – propulsive efficiency – specific impulse – solid and liquid propellant rocket engines.

TEXT BOOKS:

1. R.K. Rajput, *Thermal Engineering*, 8th edition, Laxmi Publications, 2010.
2. P.K. Nag, Basic *and Applied Thermodynamics*, TMH, 2nd edition 2010.
3. R.S. Khurmi & JS Gupta, *Thermal Engineering*, S.Chand, 16th edition 2008.

REFERENCE BOOKS:

1. V. Ganesan, I.C. *Engines*, TMH, 3rd edition 2008.
2. Mathur and Sharma, *IC Engines*, Dhanpat Rai & Sons, 2005.
3. B. Srinivasulu Reddy, *Thermal Engineering Data Book*, I.K. International Publications,2007.
4. R. Yadav, *Thermodynamics and Heat Engines*, Central Book Depot.
5. B.S. Reddy and K.H. Reddy, *Thermal Engineering Data Book*, I.K. International.

III B. Tech. – I Semester

(10BT50302) **DYNAMICS OF MACHINERY**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*--*	*4*

PRE-REQUISITES:

Engineering Mechanics, Strength of Materials, Kinematics of Machinery

COURSE DESCRIPTION:

Static force analysis, dynamic analysis; principles of linear and angular momentum and the work-energy relationships, graphical and analytical methods; Analysis and balancing of shaking forces in machines, Governors; Vibrations, single degree, Multi degrees of freedom vibrations, spring mass systems; transmissibility of forces, Dunkerley's method, Rayleigh's method; Whirling of shafts; isolation of systems, vibration instrumentation and standards.

COURSE OUTCOMES:

On completion of the program, a successful student will be able to:

- ***CO1.*** *Identify situations where dynamics of machinery needs to be studied.*
- ***CO2.*** *Use analysis methods to provide preliminary and case specific information for design of mechanical dynamic systems involving imbalance, vibrations, flywheel and gyroscopic effects.*
- ***CO3.*** *Detect possible sources of imbalance and suggest means of rectifications.*
- ***CO4.*** *Analyze complex dynamic systems through systematic approach by identifying suitable subsystems.*
- ***CO5.*** *Address the issues of safety in dynamic systems involving moving parts.*

UNIT – I: STATIC ND DYNAMIC FORCE ANALYSIS

Static force analysis of planer mechanisms, Dynamic force analysis including inertia and frictional forces of planer mechanisms

UNIT – II: GYROSCOPES

Gyroscopes, Effect of precession motion on the stability of moving vehicles, Gyroscopic forces and couples, Gyroscopic stabilization, Ship stabilization, Stability of four wheel and two wheel vehicles moving on curved paths.

UNIT –III: CLUTCHES

Friction clutches- single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, and Centrifugal Clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, Internal expanding brake, Band brake of vehicle, Dynamometers – absorption and transmission types, Prony brake, Rope brake and band brake dynamometers, Belt transmission dynamometer, Torsion dynamometer, Hydraulic dynamometer.

UNIT – IV: TURNING MOMENT DIAGRAM AND FLY WHEELS
Turning moment diagrams for steam engine, I.C. engine and multi cylinder engine, Crank effort - coefficient of fluctuation of energy, Coefficient of fluctuation of speed – fly wheels and their design.

UNIT-V: GOVERNORS

Watt, Porter and Proell governors, Spring loaded governors – hartnell and hartung governors with auxiliary springs, Sensitiveness, Isochronisms and hunting – effort and power of a governor.

UNIT – VI: BALANCING OF ROTATING MASSES
Single and multiple – single and different planes
BALANCING OF RECIPROCATING MASSES: Primary, Secondary and higher balancing of reciprocating masses, Analytical and graphical methods, Unbalanced forces and couples – v, Multi cylinder, In -line and radial engines for primary and secondary balancing, Locomotive balancing – Hammer blow, Swaying couple, Variation of tractive force.

UNIT – VII: VIBRATION
Basic features of vibratory systems-elements, Degrees of freedom, Single degree of freedom system, Free Vibration of mass attached to vertical spring –transverse loads, Vibrations of beams with concentrated and distributed loads, Dunkerly's method, Raleigh's method, Whirling of shafts, Critical speeds and torsional vibrations, Simple problems on forced, Damped vibration, Vibration Isolation & Transmissibility.

UNIT – VIII: PROPERTIES OF VIBRATING SYSTEMS
Flexibility and stiffness matrices, Maxwell's reciprocal theorem, Introduction to multi-degree-of-freedom systems.
VIBRATION MEASUREMENTS AND CONTROL: Selection of measuring instruments – accelerometer – dynamic properties and selection of structural materials for vibration control.

TEXT BOOKS:

1. S.S.Rattan, *Theory of Machines and Mechanisms*, Tata McGraw Hill Publishers.
2. R.S Khurmi, *Theory Of Machines*, S.Chand Publications.

REFERENCE BOOKS:

1. Joseph Edward Shigley and John Joseph Uicker, Jr. *Theory of Machines and Mechanisms,* Second Edition, MGH, New York.
2. J.S. Rao and R.V. Dukkipati, *Mechanism and Machine Theory,* Second Edition New age International.
3. Ballaney P L, *Theory of Machines and Mechanisms*, Khanna Publishers, New Delhi, 2005
4. Bevan T, *Theory of Machines*, Third Edition, CBS Publishers and Distributors, New Delhi, 2002.

III B. Tech. – I Semester

(10BT50303) **MACHINE TOOLS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*--*	*4*

PRE-REQUISITES:

Manufacturing Technology.

COURSE DESCRIPTION:

Theory of Metal Cutting; Geometry of Cutting Tools; Merchants Force Diagram; Lathe Machine-Principle of Operation, Tools, Multi-spindle lathes ;shaping, slotting and planning machines;drilling,boring,jigboring,millingmachineSpecifications;grinding,lapping,honing;principles of design of jigs and fixtures.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

- ***CO1.*** *Identify and explain the functions of the basic components of a machine tool.*
- ***CO2.*** *Apply merchant circle diagram to estimate geometry of tool from estimated forces.*
- ***CO3.*** *Specify required machining operation to achieve the specified geometry, and estimate machining time and metal removal rate.*

UNIT – I:

Introduction to theory of metal cutting, Different types of metal removal processes, Geometry of single point tool and angles chip formation and types of chips – built up edge and its effects, Chip breakers, Mechanics of Orthogonal cutting –merchant's Force diagram, cutting forces – cutting speeds, feed, Depth of cut, tool life, Thermal aspects-coolants, machinability–economics- tool materials.

UNIT – II:

Engine lathe – Principle of working, Specification of lathe – types of lathes – work holders, Tool holders – box tools, Taper turning, Thread turning and attachments for Lathes.

Turret and capstan lathes–Collet chucks–other work holders–tool holding devices.

Automatic lathes– Classification–single spindle and multi-spindle automatic lathes.

UNIT – III:

Shaping, Slotting and planning machines – Their Principles of working – principal parts – specification, Classification, Operations performed, Machining time calculations.

UNIT – IV:

Drilling and Boring Machines – Principles of working, Specifications, Types, Operations performed – tool holding devices – twist drill – boring machines – fine boring machines – jig boring machine, Deep hole drilling machine.

UNIT – V:

Milling machine – Principles of working – specifications – classifications of milling machines – principal features of horizontal, vertical and universal milling machines –

machining operations, Types of milling cutters– methods of indexing – accessories to milling machines.

UNIT – VI:
Grinding machine –Theory of grinding – classification of grinding machine –cylindrical. Surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – grinding wheel, Different types of abrasives – bonds, specification and selection of a grinding wheel.

UNIT – VII:
Lapping, Honing and Broaching machines –super finishing, Polishing, Buffing operations.

UNIT – VIII:
Principles of design of Jigs and fixtures and uses. Classification of Jigs & Fixtures – principles of location and clamping – types of clamping & work holding devices, Typical examples of jigs and fixtures.

TEXT BOOKS:

1. Hazra Choudary S.K. and A.K., *Workshop Technology*, *Vol II*, Media Promoters
2. *R.K. Jain and S.C. Gupta, Production Technology, Khanna Publishers.*
3. *G.R.Nagpal, Tool Engineering And Design, Khanna Publishsers, 2004.*

REFERENCE BOOKS:
1. C.Elanhezhian and M. Vijayan, *Machine Tools*, Anuradha Agencies Publishers.
2. Kalpakzian, *Manufacturing Technology,* Pearson
3. H.M.T. (Hindustan Machine Tools), *Production Technology*,.
4. Date, *Introduction to Manufacturing Technology,* Jaico Publishing House

III B. Tech, I semester

(10BT50304) **DESIGN OF MACHINE ELEMENTS – I**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*--*	*4*

PRE-REQUISITES:

Engineering Mechanics, Strength of Materials

COURSE DESCRIPTION:

General considerations of design, design process; BIS codes of materials; Preferred numbers; Simple stresses, Combined stresses; theories of failure; Stress concentration; Goodman's line, Soderberg's line; design of riveted joints; threaded joints; shafts; keys; muff, Split muff and Flange couplings, Flexible couplings; spigot and socket cotter joint, knuckle joint;

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

- ***CO1.*** *Demonstrate knowledge on basic machine elements used in machine design; design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.*
- ***CO2.*** *Analyze the mechanical properties and understand, identify and quantify failure modes for mechanical parts.*
- ***CO3.*** *Design for cross-sectional dimensions of components to withstand the loads.*
- ***CO4.*** *Detect possible sources of failures and suggest means of rectifications.*
- ***CO5.*** *Address the issues of safety in design involving moving parts such as flywheels, gear etc.,*
- ***CO6.*** *Provide environmentally safe and cost effective design solutions.*

UNIT – I: INTRODUCTION

Design philosophy-types of design, General considerations of design, design process, Selection of Engineering Materials – properties, Manufacturing considerations in the design, BIS codes of materials, Preferred numbers.

UNIT – II: STRESSES IN MACHINE MEMBERS

Simple stresses, Combined stresses, Torsional and bending Stresses, Impact stresses, Stress -strain relation, Various theories of failure, Factor of safety, Design for strength and rigidity, Concept of stiffness in tension- bending, Torsion and Combined cases.

UNIT – III: STRENGTH OF MACHINE ELEMENTS

Stress concentration, Notch sensitivity, Design for fluctuating stresses, Endurance limit, Estimation of Endurance strength, Goodman's line and Soderberg's line.

UNIT – IV: RIVETED JOINTS

Types of riveted joints, Design of riveted joints, Boiler shell riveting, Eccentric loading.

UNIT –V: BOLTED JOINTS

Forms of Screw threads, Stresses in Screw fasteners, Design of bolts with pre-stresses, Design of joints under eccentric loading, Bolts of uniform strength.

UNIT – VI: COTTERS AND KNUCKLE JOINTS

Design of Cotter joints - spigot and socket, Sleeve and cotter, Jib and cotter joints, Knuckle joints.

UNIT – VII: SHAFTS

Design of solid and hollow shafts for strength and rigidity, Design of shafts for combined bending and axial loads, Shaft sizes – BIS code.

UNIT – VIII: KEYS AND COUPLINGS

Design of Keys and Keyways, Design of Rigid couplings - muff, Split muff and Flange couplings, Flexible couplings.

TEXT BOOKS:

1. Hall, Holowenko, Laughlin, *Machine design,* Schaum Series, Fifth edition, 2011.
2. Pandya & Shah, *Machine design*, Charotar publications, seventeenth edition, 2009.
3. R.K.Jain, *Machine Design*, Khanna Publications, 1978.
4. V.B.Bhandari, *Design of Machine Elements*, Tata McGraw Hill publication, Third edition, 2010.

REFERENCE BOOKS:

5. J.E.Shigley, Machine design, Pearson, Second edition, 2009.
6. R S Khurmi and J K Gupta, Machine design, S.Chand, 2012.
7. M.F.Spotts, Design of Machine Elements, PHI, 2004.
8. Kannaiah, Machine Design, Scitech.

NOTE: Design data books are not permitted in the examinations. The design must not only satisfy strength criteria but also rigidity criteria.

III B. Tech. – I Semester

(10BT50305) **INDUSTRIAL ENGINEERING AND MANAGEMENT**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*-*	*-*	*4*

PRE-REQUISITES:

General engineering and decision making background.

COURSE DESCRIPTION:

Concepts and functions of management and organization; selection and analysis of plant location and plant layout; method study and work measurement; inventory, stores and purchase management functions; techniques of statistical process control; entrepreneurial decision process and professional ethics; human resource management and industrial safety.

COURSE OUTCOMES:

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

CO1. *Use Industrial Engineering and Management concepts for solving routine management related problems in an industrial scenario.*

CO2. *Analyze an industrial problem and identify probable causes and to suggest suitable remedies to increase the productivity and reduce the cost/wastages.*

CO3. *Employ systematic approach to simplify a complex problem in to a manageable sub-problem for quicker solution.*

CO4. *Exercise discernment in following ethical code of conduct in professional activities.*

CO5. *Motivate people towards greater productivity and synergy.*

UNIT – I: PRINCIPLES OF MANAGEMENT

Concepts of Management and Organization –evolution of management thought - Taylor's scientific management- Fayol's principles of management– systems approach to management- functions of management-planning, Organizing, Staffing, Controlling and Directing.

UNIT – II: FACILITIES PLANNING

Plant location-definition- factors affecting the plant location- comparison of rural and urban sites-Methods for selection of plant- matrix approach, Plant layout – definition, Objectives, Types of production, Types of plant layout – various data analyzing forms-Travel chart.

UNIT – III: WORK STUDY

Definition, Objectives, Method study - definition, Objectives, Steps involved- various types of associated charts-Difference between micro-motion and memo-motion studies, work measurement- definition, Time study, Steps involved-equipment, Different methods of performance rating- allowances, Standard time calculation, Work sampling – definition, Steps involved, Standard time calculations, Differences with time study- applications.

UNIT – IV: MATERIALS MANAGEMENT
Objectives, Inventory – functions, Types, Associated costs, Inventory classification techniques, Stores management and stores records, Purchase management, Duties of purchase manager, Associated forms, Value Analysis.

UNIT – V: STATISTICAL PROCESS CONTROL
Pareto diagram, Process flow diagram, Cause and effect diagram, Check sheets, Histogram, Scatter diagram, Control charts, State of control, Out of control process, Process capability, Measurement system analysis.

UNIT – VI: PLANT MAINTENANCE AND RELIABILITY
Plant maintenance-objectives of plant maintenance-importance of plant maintenance-organization of maintenance department-types of maintenance- breakdown Maintenance, Scheduled Maintenance, Preventive Maintenance, Predictive Maintenance- recent Developments in Plant Maintenance. Reliability-definition, MTBF, Failure rate, Common failure rate curve, Types of failure, Series, parallel and series-parallel device configurations, Redundancy.

UNIT – VII: ENTREPRENEURSHIP AND PROFESSIONAL ETHICS
Meaning of Entrepreneur-Evolution of the concept- Functions of Entrepreneur-Entrepreneurial Decision process- entrepreneurship Barriers, Professional Ethics-Professional code of conduct, Professional rights.

UNIT – VIII: HUMAN RESOURCE MANAGEMENT
Functions of HRM, Job evaluation, Different types of evaluation methods, Job description, Merit Rating- Difference with job evaluation, Different methods of merit ratings, Wage incentives and different types of wage incentive schemes.
Industrial safety, Factories act, Workmen compensation act, Industrial disputes act.

TEXT BOOKS:

1. Amrine, *Manufacturing Organization and Management*, Pearson.
2. O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai.

REFERENCE BOOKS:

1. Stoner, Freeman, Gilbert, *Management*, 6th Edition, Pearson Education.
2. Besterfield et al., *Total Quality Management,* Pearson Education.
3. Pannerselvam, *Production and Operations Management*, PHI.
4. Ralph M Barnes, *Motion and Time Studies*, John Wiley and Sons.
5. Chase, Jacobs, Aquilano, *Operations Management*, TMH 10th Edition.

III B. Tech. – II Semester

(10BT60301) **OPERATIONS RESEARCH**

Int. Marks	**Ext. Marks**	**Total Marks**	**L**	**T**	**P**	**C**
30	*70*	*100*	*4*	*1*	*--*	*5*

PRE-REQUISITES:
Engineering Mathematics, Numerical Methods

COURSE DESCRIPTION:
Quantitative methods and techniques for effective decision making; model formulations and applications pertinent to business decision problems; mathematical tools for solving deterministic or stochastic problems, decision and operation of complex systems; linear programming formulations and optimization; transportation models; inventory control; replacement and queuing models; project management; game theory application.

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

CO1. Identify mathematical model to employ in a given application requiring optimization.

CO2. Analyze a practical situation and formulate appropriate objective function and constraints.

CO3. Apply concepts of operations research to maximize the efficiency and minimize the wastage in select situations.

UNIT – I:
OR methodology, Definition of OR, Application of OR to Engineering and Managerial problems, Features of OR models, Limitations of OR.
ALLOCATION: Linear Programming Problem Formulation – graphical solution – simplex method –artificial variables techniques -two–phase method, Big-M method – duality Principle-economic interpretation of duality.

UNIT – II: TRANSPORTATION PROBLEM
Formulation – optimal solution, Unbalanced transportation problem –degeneracy, Transshipment problem - assignment problem – formulation – optimal solution - variants of assignment Problem.

UNIT – III: REPLACEMENT
Introduction – replacement of items that deteriorate with time – when money value is not considered and considered – replacement of items that fail completely, Group replacement.

UNIT – IV: WAITING LINES
Introduction – single channel – poisson arrivals – exponential service times – with finite queue length and non finite queue length models– multichannel – poisson arrivals – exponential service times with finite queue length and non finite queue length models.

UNIT – V: PROJECT MANAGEMENT USING NETWORK ANALYSIS

Network construction, Determination of critical path and duration, floats, PERT-Estimation of project duration, Variance, CPM - elements of crashing, Least cost project scheduling.

UNIT – VI: INVENTORY MODELS

Factors involved in inventory problem analysis, Inventory costs and deterministic inventory control models – single item inventory control models: without shortages, With shortages, with quantity discounts.

UNIT – VII: DECISION ANALYSIS

Decision making under certainty, Decision making under risk – expected value of perfect information and imperfect information, Decision tree and decision making under uncertainty – hurwicz criterion, Laplace criterion and savage criterion, Analytic Hierarchy Process.

UNIT – VIII: THEORY OF GAMES

Introduction – minimax (maximin) 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.

TEXT BOOKS:

1. Hamdy A Taha, *Introduction to Operations Research*, PHI.
2. Kanti Swarup, P.K. Gupta, Manmohan, *Operations Research*, Sultan Chand Publications.
3. J.K. Sharma, *Operations Research*, Macmillan.

REFERENCES

1. A.M. Natarajan, P.Balasubramani, A. Tamilarasi, *Operations Research,* Pearson.
2. R.Panneerselvam, *Operations Research,* PHI.
3. Hiller & Libermann, *Introduction to Operations Research*, TMH.
4. Wayne L. Winston, *Operations Research*, Thomson Brooks, Cole.
5. P.K.Gupta and D.S. Hira, *Operations Research*, S.Chand.

III B. Tech. – II Semester

(10BT60302) **METROLOGY AND MEASUREMENTS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:
10+2 Physics, Engineering Physics, Machine Drawing, Machine tools

COURSE DESCRIPTION:

The fundamentals of Metrology; need of inspection, selective assembly, interchangeability, the concept of measurement and its tools to control the manufacturing process parameters to maintain required precision; use of a variety of measuring tools and instruments ;calculation of geometric , form tolerances and others with accurate assessment of fits, precision and Non-precision instruments; calibration with standards, measurement of force, torque, strain, pressure and temperature including their behavioral aspects such as linearity, threshold and drift etc.

COURSE OUTCOMES:
On completion of the program, a successful student will be able to:

CO1 *Identify the uncertainties in dimensional Metrology by defining measurement standards and use electronic Instrumentation.*

CO2 *Analyze the measurement requirement and choose effective methods of measuring straightness, flatness, roundness and profiles of screw threads and gear teeth and such other metrology practices.*

CO3 *Employ knowledge in selecting a suitable instrument/measurement method for a given application.*

CO4 *Recognize the importance of accuracy and precision as a mechanical engineer through self motivation for a defect- free product by using modern tools*

UNIT – I: STANDARDS OF MEASUREMENT
Definition and Objectives of metrology, Standards of length - international prototype meter, Imperial standard yard, Wave length standard, Subdivision of standards, Line and end standard, Comparison, Transfer from line standard to end standard, Calibration of end bars (Numerical), Slip gauges, (M-87, M-112), Wringing phenomena.

UNIT – II: SYSTEM OF LIMITS, FITS, TOLERANCES AND GAUGING
Definition of tolerance, Principle of inter changeability and selective assembly, Concept of limits of size and tolerances, Compound tolerances, Accumulation of tolerances, Definition of fits, Types of fits, Hole basis system, Shaft basis of system, Classification of gauges, Types of plain gauges - plug gauge, Ring Gauge, Snap gauge.

UNIT – III: COMPARATORS AND ANGULAR MEASUREMENT
Introduction to Comparator, Characteristics, Classification of comparators, Mechanical comparators - sigma Comparators, Solex Comparators, Optical Comparators, LVDT, Introduction to angular measurements, Bevel Protractor, Sine Principle, Sine bar, Sine center, Angle gauges.

UNIT – IV: INTERFEROMETERY, SCREW THREAD MEASUREMENT
Interferometer Principle of Interferometry, Autocollimator, Optical flats, Terminology of screw threads, Measurement of major diameter, Minor diameter, Pitch, Angle and effective diameter of screw threads by 2-wire and 3-wire methods, Tool makers microscope.

UNIT – V: MEASUREMENTS AND MEASUREMENT SYSTEMS
Definition, Significance of measurement, Generalized measurement system, Definition and concept of accuracy, Precision, Sensitivity, Calibration, Threshold, Hystersis, Repeatability, linearity, Loading effect, System response, Time delay, Uncertainity, Introduction to Transducers, Transfer efficiency, Primary and secondary transducers, Mechanical, Electrical, Electronic transducer, Advantages of each type transducer.

UNIT – VI: MEASUREMENT OF FORCE, TORQUE AND PRESSURE
Force Measurement-principle, Analytical balance, Platform balance, Proving ring, Torque measurement - prony brake, Hydraulic dynamometer, Pressure Measurements - principle, piezoelectric transducers, Electrical resistance pressure gauges, Mcloed gauge.

UNIT – VII: TEMPERATURE AND STRAIN MEASUREMENT
Temperature measurements-Resistance thermometers, Thermocouple, application laws of thermocouple, Materials and construction of thermocouple, Pyrometer, Spectral-band pyrometer. Strain Measurements- Strain gauge, Preparation and mounting of strain gauges, Gauge factor, Methods of strain measurement.

UNIT – VIII: DYNAMIC CHARACTERISTICS OF INSTRUMENT SYSTEMS
Dynamic behaviour, Mathematical models of system, Time constant, Mechanical and thermal systems. Transfer functions, Orders of a system, Zero order, First order system.

TEXT BOOKS:

1. *M. Mahajan, A Text-Book of Metrology, Dhanpat Rai & Co., New Delhi.*
2. *Thomas G. Beckwith, Roy D. Maragoni, John H. Lienhard V, Mechanical Measurements, Pearson Education International.*

REFERENCE BOOKS:

1. *I.C. Gupta, A Text-Book of Engineering Metrology, Dhanpat Rai & Co., New Delhi.*
2. *R.K.Jain, Engineering Metrology, Khanna Publishers, New Delhi.*
3. *Ernest O.Doblin, Measurements Systems Applications and Design, Tata Mc GrawHill, New Delhi.*
4. *Alsutko, Jerry.D.Faulk, Industrial Instrumentation, Thompson Asia Pvt.Ltd.*

III B.Tech – II Semester

(10BT60303) **HEAT TRANSFER**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*--*	*4*

PRE-REQUISITES :

Engineering Mathematics, Thermodynamics, Fluid mechanics

COURSE DESCRIPTION:

Heat transfer concepts of conduction, convection, and radiation; One-dimensional steady and transient conduction; Analysis of extended surfaces; Convection heat transfer for both free and forced convection regimes; Heat exchangers; general characteristics of radiation; properties of radiating surfaces and radiative heat exchange between surfaces.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

- **CO1.** Employ the basic knowledge of mechanisms of heat transfer in steady and unsteady flow in thermal system.
- **CO2.** Analyze the components in a thermal equipment and identify various heat transfer phenomena and develop mathematical models.
- **CO3.** Provide solutions for altering heat flow in desired manner.

UNIT – I:

Introduction: Modes and mechanisms of heat transfer – basic laws of heat transfer – general applications of heat transfer.

Conduction Heat Transfer: Fourier rate equation – general heat conduction equation in Cartesian, Cylindrical and Spherical coordinates.

UNIT – II:

Simplification and forms of the field equation – steady, Unsteady and periodic heat transfer – boundary and Initial conditions.

One Dimensional Steady State Heat Conduction: In Homogeneous slabs, Hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – critical radius/thickness of insulation-with variable thermal conductivity –with internal heat sources or Heat generation. Extended surface (fins) Heat Transfer – long Fin, Fin with insulated tip and Short Fin, Application to errors in Temperature measurement.

UNIT – III:

One Dimensional Transient Heat Conduction: In Systems with negligible internal resistance – significance of biot and fourier Numbers - chart solutions of transient conduction systems- problems on semi-infinite body.

UNIT – IV:

Convective Heat Transfer: Dimensional analysis–buckingham theorem and its application for developing semi – empirical non- dimensional correlations for convective heat transfer – significance of non-dimensional numbers – concepts of Continuity, Momentum and Energy Equations.

UNIT – V:

Forced convection: External Flows: Concepts of hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer for flow over-Flat plates, Cylinders and spheres.

Internal Flows: Division of internal flow through Concepts of Hydrodynamic and thermal entry lengths – use of empirical relations for convective heat transfer in horizontal pipe flow, Annular 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 – VI:

Heat Transfer with Phase Change: Boiling: Pool boiling – regimes, Determination of heat transfer coefficient in Nucleate boiling, Critical heat flux and film boiling.

Condensation: Film wise and drop wise condensation –nusselt's theory of condensation on a vertical plate - film condensation on vertical and horizontal cylinders using empirical correlations.

UNIT – VII: Heat Exchangers

Types- tube arrangements, Single & Multi tube types, Parallel, Counter & Cross flow heat exchangers – overall heat transfer Coefficient and fouling factor – concepts of lmtd and ntu methods - problems using lmtd and ntu methods.

UNIT – VIII: Radiation Heat Transfer

Emission characteristics and laws of black-body radiation – irradiation – total and monochromatic quantities– laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – emissivity – heat exchange between gray bodies – radiation shields.

TEXT BOOKS:

1. R.C. Sachdeva, *Fundamentals of Engineering Heat and Mass Transfer*, 4rd edition, New Age International
2. Kondandaraman, C.P., *Fundamentals of Heat and Mass Transfer,* 3rd edition, New Age International, 2006.
3. R.K.Rajput, *Heat and Mass Transfer*, S.Chand & Company Ltd.

REFERENCE BOOKS:

1. P.K.Nag, *Heat Transfer*, 2nd edition, TMH, 2010
2. Holman.J.P, *Heat Transfer*, 9th edition, TMH, 2010
3. Incropera, *Fundamentals of Heat Transfer,* 7th edition, Wiley India.
4. Ghoshdastidar, *Heat Transfer*, Oxford University Press, 2004
5. B.S.Reddy and K.H.Reddy, *Thermal Engineering Data Book,* I.K. International.
6. Yunus Cengel, *Heat And Mass Transfer, Mc Graw Hill Publications*

Codes/Tables: Thermal Engineering Data Book to be supplied in Exams.

III B. Tech. – II Semester

*(10BT60304)***CAD/CAM**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*--*	*4*

PRE-REQUISITES:

Engineering Drawing, Machine Drawing, Manufacturing Technology

COURSE DESCRIPTION:

*Fundamental and conventional CAD processes; Raster scan graphics co-ordinate system; 3D transformations; Geometric construction models; Curve representation methods; Structure of NC machine tools; CNC Part Programming; CAPP; AMS; FMS; JIT; Computer Control Systems; Capacity Planning; MRP-I; MRP-II; Inspection methods***.**

COURSE OUTCOMES:

On completion of the program, a successful student will be able to:

- **CO1.** Use the concepts of CAD/CAM to generate a suitable geometric model of an object.
- **CO2.** Analyze the features on an object and develop process planning chart/ part program.
- **CO3.** Use popular drafting packages to develop geometric models of parts and their assemblies.
- ***CO4.*** Use computer aided quality control methods to detect manufacturing errors during inspections.

UNIT – I:

Introduction to cad cam, Conventional cad process – advantages and disadvantages, Computers in Industrial Manufacturing, Product cycle, CAD/CAM Hardware, Basic structure, cpu, Memory types, input devices, display devices, Hard copy devices and storage devices.

UNIT – II: COMPUTER GRAPHICS & DRAFTING

Raster scan graphics coordinate system, Database structure for graphics modeling, Transformation of geometry, 3D transformations, Geometric commands, Layers, Display control commands, Editing, Dimensioning.

UNIT – III: GEOMETRIC MODELING

Requirements, Geometric models, Geometric construction models, Curve representation methods, Surface representation methods, Modeling facilities desired.

UNIT – IV: NUMERICAL CONTROL

NC, NC modes, NC elements, NC machine tools, Structure of cnc machine tools, Features of Machining center, Turning center, cnc Part Programming - fundamentals, Manual part programming methods, Computer Aided Part Programming.

UNIT – V: GROUP TECHNOLOGY

Part family, Coding and classification, Production flow analysis, Advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

UNIT – VI: TYPES OF MANUFACTURING SYSTEMS

Automated Manufacturing systems, Flexible manufacturing Systems(FMS), Material handling systems-types and applications, computer control systems, JIT, Human labor in manufacturing systems.

UNIT – VII: COMPUTER INTEGRATED PRODUCTION PLANNING

Capacity planning, Shop floor control, MRP-I, MRP-II, CIMS benefits.

UNIT – VIII: COMPUTER AIDED QUALITY CONTROL

Terminology in quality control, The computer in QC, Contact inspection methods, Non-contact inspection methods-Optical non-contact inspection methods-non-optical computer aided testing.

TEXT BOOKS:

1. Ibrahim Zeid, CAD/CAM Theory and Practice, Mc Graw Hill.
2. A Zimmers & P.Groover, CAD/CAM, PHI
3. P.N. Rao, CAD/CAM-Principles and applications, TMH

REFERENCE BOOKS:

1. Mikell P. Groover, Automation, Production systems & Computer integrated Manufacturing, Prentice Hall
2. Radhakrishnan and Subramaniah, CAD/CAM/CIM, New Age International
3. Farid Amirouche, Principles of Computer Aided Design and Manufacturing, Pearson
4. R. Sivasubramaniam, CAD/CAM Theory and Practice, TMH
5. Lalit Narayan, Computer Aided Design and Manufacturing, PHI.
6. T.C. Chang, Computer Aided Manufacturing, Pearson
7. C.S.P. Rao, A Text Book of CAD/CAM, Hitech Publishers.

III B. Tech, II semester

(10BT1ES07) **DESIGN OF MACHINE ELEMENTS -II**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*-*	*4*

PRE-REQUISITES:

Engineering Mechanics, Strength of materials, Design of machine elements-1

COURSE DESCRIPTION:

Study, analysis and design of machine components such as fasteners, mechanical springs, spur gears, bevel gears, Journal bearings, anti friction bearings; internal combustion engine parts such as piston, crank and connecting rod; Safety and reliability consideration in machine design; detailed design to define the shape, size and material.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO:1 *Demonstrate knowledge on basic machine elements used in machine design; design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.*

CO:2 *Analyze the mechanical properties; and understand, identify and quantify failure modes for mechanical parts.*

CO:3 *Approach a design problem successfully, taking decisions when there is no unique answer/solution.*

CO:4 *Provide innovative solutions/improvisation to improve trial designs of complex systems.*

UNIT – I: 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 – II: DESIGN OF POWER SCREWS
Design of screw, Square acme, Buttress screws- efficiency of the screw. Design of nut, Compound screw, Differential screw, Ball screw- possible failures.

UNIT – III: POWER TRANSMISSION SYSTEMS
Design of flat belt drives, V-belt drives & rope drives. Selection of wire ropes,.

UNIT – IV: JOURNAL BEARINGS
Lubricants, Types of lubrication, Hydrodynamic and hydrostatic lubrication, Bearing modulus, Friction circle, Bearing characteristic number, McKee’s equation, Sommerfeld number, Types of journal bearings, Full and partial journal bearings, Clearance ratio, Bearing materials, Journal bearing design, Bearing life, Failure of bearings.

UNIT – V: ANTI FRICTION BEARINGS

Ball and Roller Bearings, Nominal Life, Average Life, Static Load, Dynamic Load Equivalent Radial Load, Design and Selection of Ball and Roller Bearings.

UNIT – VI: DESIGN OF SPUR AND HELICAL GEARS

Classification of gears, Gear terminology, Design of spur, Helical gears, Lewis Equation - bending strength, Buckingham dynamic load equation, Wear strength equation.

UNIT – VII: MECHANICAL SPRINGS

Stress and deflections of helical springs-springs for fatigue loading – natural frequency of helical springs-energy storage capacity- helical torsion springs- leaf springs-coaxial springs.

UNIT – VIII: DESIGN OF I.C ENGINE PARTS

Design of connecting rod, Design of piston for IC engine, Design of crank and crankshafts, Introduction to Optimum design.

TEXT BOOKS:

1. V.B.Bhandari, Design of *Machine Elements*, TMH
2. R.K.Jain, *Machine Design*, Khanna Publications.
3. N.C. Pandya and Shah, *Elements of Machine Design*, Charotar Publishing House,15th edition 2004.

REFERENCE BOOKS:

1. JE Shigley, *Mechanical Engineering Design,* McGraw Hill.
2. Data Books : (i) P.S.G. College of Technology (ii) Balaveera Reddy and Mahadevan
3. T.V.Sundaramoorthy & N.Shanmugam, *Machine Design*
4. Kanniah, *Machine Design,* Scitech Publishers
5. R.S. Khurmi & J.S.Gupta, *Machine Design,* S.Chand

Data Hand Book

Mahadevan and Balaveera Reddy, *Machine Design Data Hand Book*, CBS Publishers, New Delhi.

III B.Tech II Semester

(10BT60306) **AUTOMOBILE ENGINEERING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*--*	*--*	*4*

PRE-REQUISITES:

Thermal Engineering-I, Thermal Engineering Lab

COURSE DESCRIPTION:

Basic components and classification of automobiles; Fuel Supply System; Cooling System; Ignition System; Emissions from automobiles; Pollution control Techniques; Electrical Systems; Transmission System; Steering System; Suspension and Braking System.

COURSE OUTCOMES:

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

CO1. Employ the basic knowledge in building the body of an automobile.
CO2. Analyze the transmission losses, fuel injection losses, heat losses and over steering of an automobile.
CO3. Present the probable solution in the design of anti lock braking systems, and low stress suspension systems, high pressure injection system of an automobile.
CO4. To identify the manageable areas of combustion chambers to minimize the heat losses.

UNIT I - *INTRODUCTION*:

Classification of vehicles, Components of a four wheeler automobile – chassis and body – power unit –power transmission – rear wheel drive, Front wheel drive, Turbo charging and super charging – oil filters, Oil pumps – crank case ventilation.

FUEL SYSTEM:

S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pump – air and fuel filters– carburetor – types

C.I. ENGINES: *Requirements of diesel injection systems, Types of injection systems, Fuel pump, Nozzle spray formation, Injection timing.*

UNIT II - *COOLING SYSTEM*:

Necessity of cooling system, Cooling Requirements, Air Cooling, Liquid Cooling, Thermo, Water and Forced Circulation System – radiators – types – cooling Fan - water pump, Thermostat, Evaporative cooling – antifreeze solutions.

IGNITION SYSTEM: *Function of an ignition system, Battery ignition system, Constructional features of storage battery, Condenser and spark plug – magneto coil ignition system, Electronic ignition system using contact breaker, and Electronic ignition using contact triggers.*

UNIT III - *EMISSIONS FROM AUTOMOBILES:*

Pollution standards National and international – Pollution Control– Techniques – Multipoint fuel injection for SI Engines - Common rail diesel injection Emissions from alternative energy sources– Hydrogen, Biomass, Alcohols, LPG, CNG - Their merits and demerits.

UNIT IV - *TRANSMISSION SYSTEMS:*

Clutch- types-coil spring and diaphragm type clutch, Single and multi plate clutch, Centrifugal clutch, Gear box -types-constant mesh, Sliding mesh and synchromesh gear box, Layout of gear box, Gear selector and shifting mechanism, Automatic transmission, Propeller shaft, Universal joint, Differential and real axle arrangement.

STEERING SYSTEM:

Types of steering systems, Ackermann principle, Davis steering gear, Steering gear boxes, Power steering, Camber toe-in, toe out etc,

UNIT V - *SUSPENSION SYSTEM:*

Need of suspension system, Objects of suspension systems – rigid axle suspension system, Torsion bar, Shock absorber, Independent suspension system.

BRAKE ACTUATING SYSTEM: *Classification of brakes, Mechanical brake system, Hydraulic brake system, Pneumatic and vacuum brake systems.*

TEXT BOOKS:

1. Kirpal Singh, Automotive Mechanics,Vol.1 &Vol.2.
2. William Crouse, Automobile Engineering, Tata McGraw-Hill
3. Srinivasan, Automotive Engines, Tata McGraw-Hill Education, New Delhi.

REFERENCE BOOKS:

1. R.K.Rajput, Automobile Engineering, Lakshmi Publication.
2. K.K. Ramalingam, Automobile Engineering, Scitech Publication.
3. Newton, Steeds & Garret Automotive Engines.
4. Thipse, Alternate Fuels, Jaico Publ. House

IV B. Tech. I semester

(10BT70301) MANUFACTURING SYSTEMS DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES:

Industrial Engineering and Management, CAD/CAM

COURSE DESCRIPTION:

Introduction to Manufacturing systems and models; Automated Manufacturing systems; performance measures of manufacturing systems; high volume production systems; product and process layouts; Introduction to Flexible Manufacturing systems; Optimization Techniques; Simulation in system design.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: *Employ knowledge of manufacturing philosophies in proposing a preliminary flexible manufacturing system.*

CO 2: *Use the methodologies required for simulating a manufacturing system.*

CO 3: *Identify the stages involved in the design and manufacturing of a product and conduct cost benefit analysis.*

UNIT – I: INTRODUCTION TO MANUFACTURING SYSTEMS AND MODELS

Types and principles of manufacturing systems, Types of manufacturing models-physical models-mathematical models, Model uses, Model building, Input –output model.

UNIT – II: INTRODUCTION TO AUTOMATED MANUFACTURING SYSTEMS

History of manufacturing, The product cycle, Manufacturing automation, Modeling of automated manufacturing systems, Role of performance modeling, Performance measures, Performance modeling tools-simulation models- analytical models.

UNIT – III: PERFORMANCE MEASURES OF MANUFACTURING SYSTEMS

Performance Measures - manufacturing lead time, Work-In-Process (WIP), Machine Utilization, Throughput, Capacity, Flexibility, Performability and quality.

UNIT – IV: HIGH VOLUME PRODUCTION SYSTEMS

Automated flow lines, Methods of work part transport, Transfer mechanism, Transfer lines-terminology and analysis, Assembly systems-process, Line balancing, Methods of line balancing, Manual assembly lines, Automated assembly systems- types- design.

UNIT – V: LAYOUT DESIGN

Group technology- Introduction -part classification and coding- assigning machines to groups-Rank order clustering algorithm, Facility layout – sequential layout planning, Facilities planning & design approach to manufacturing industries.

UNIT – VI: FLEXIBLE MANUFACTURING SYSTEMS (FMS)

FMS-definition- FMS workstations, Material handling and storage systems, Computer control systems, Planning the FMS, Analysis methods for FMS, Applications and benefits.

UNIT – VII: OPTIMIZATION TECHNIQUES

Introduction, Importance, Classification of optimization techniques-mathematical programming techniques- stochastic techniques-statistical methods, Classification of optimization problems based on – Existence of constraints, Nature of design variables-physical structure of the problem-nature of equations involved- permissible values of the design variables.

UNIT – VIII: SIMULATION IN SYSTEM DESIGN

Empirical simulation models-event models, process models, Simulation system, Simulation of manufacturing system.

TEXT BOOKS:

1. Ronald. G. Askin, *Modeling and Analysis of Manufacturing Systems*, John Wiley and Sons, Inc.
2. N. Viswanadham, Y. Narahari, *Performance Modeling of Automated Manufacturing Systems,* PHI.
3. Mikell.P.Groover, *Automation , Production systems & computer integrated manufacturing*, PHI
4. S.S.Rao,*Engineering optimization,* New Age International Publications.

REFERENCE BOOKS:

1. P. Brandimarte, A Villa, *Modeling Manufacturing Systems*, Springer Verlag, Berlin.
2. Richard Crowson, *Factory Operations: Planning and Instructional Methods- Ed2*, CRC Press, Second Edition.
3. Phillip. F. Ostwald, Jairo Munoz, *Manufacturing Processes and Systems*, John Wiley and Sons Inc., 9th Edition.

IV B. Tech. I Semester

(10BT70302) INDUSTRIAL AUTOMATION AND ROBOTICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*-*	*4*

PRE-REQUISITES:
Engineering Mechanics, Kinematics of Machines, Dynamics of Machines, Matrices

COURSE DESCRIPTION:
Integration of robots and CNC machines into manufacturing cells; motion control devices, such as actuators and sensors, conveyors and part feeder mechanisms; use of automation equipment in manufacturing. Integration of automation equipment such as PLCs, motion control devices.

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

CO 1: Employ the knowledge of the course to identify the scope for introducing automation.

CO 2: Analyze the operations and specify the type of automation feasible in a given context.

CO 3: Specify an overall scheme for automating the operations in a given industry using simple automation methodologies.

CO 4: Select suitable sensors/actuators required for automating a given process.

UNIT – I: INTRODUCTION TO AUTOMATION
Automation –need-types, Basic elements of an automated system, levels of automation-hardware components for automation and process control, Mechanical feeders, Hoppers, Orienters, High speed automatic insertion devices.

UNIT – II: AUTOMATED FLOW LINES
Part transfer methods and mechanisms, Types of flow lines, Flow line with/without buffer storage, Qualitative analysis.

UNIT – III: ASSEMBLY LINE BALANCING
Assembly process and systems assembly line, Line balancing methods, Ways of improving line balance, Flexible assembly lines.

UNIT – IV: INTRODUCTION TO INDUSTRIAL ROBOTS
Robots-classification - robot configurations, Functional line diagram, Degrees of freedom, Components, Common types of arms, Joints, Grippers.

UNIT – V: MANIPULATOR KINEMATICS
Homogeneous transformations as applicable to rotation and translation - (D-H) notation, Forward and inverse kinematics.

Manipulator Dynamics: differential transformation, Jacobians , Lagrange – Euler and Newton – Euler formations.

UNIT – VI: TRAJECTORY PLANNING
Trajectory planning and avoidance of obstacles, Path planning, Skew motion, Joint integrated motion – Straight line motion.
Robot programming-types – features of languages and software packages.

UNIT – VII: ROBOT ACTUATORS AND FEED BACK COMPONENTS
Actuators- pneumatic-hydraulic actuators, Electric & stepper motors, comparison, Position sensors – potentiometers- resolvers- encoders – velocity sensors-tactile sensors-proximity sensors.

UNIT – VIII: ROBOT APPLICATION IN MANUFACTURING
Material transfer - material handling, loading and unloading- processing - spot and continuous arc welding & spray painting - assembly and inspection.

TEXT BOOKS:

1. Mikell P. Groover, *Automation, Production Systems and CIM*, Prentice-Hall of India Pvt. Ltd.
2. M.P. Groover, *Industrial Robotics*, TMH.

REFERENCE BOOKS:

1. K. S. Fu., R. C. Gonzalez, C. S. G. Lee, *Robotics: Control Sensing, Vision and Intelligence* International Edition, McGraw Hill Book Co.
2. P. Coiffet and M.Chaironze, *An Introduction to Robot Technology*, Kogam Page Ltd. 1983 London.
3. Richard. D.Klafter, *Robotics Engineering*, Prentice Hall
4. Ashitave Ghosal, *Robotics, Fundamental Concepts and analysis*, Oxford Press, 2006
5. Mittal R.K & Nagrath IJ, *Robotics and Control*, TMH.
6. John. J. Craig, *Introduction to Robotics*, Pearson.

IV B. Tech. I Semester

(10BT70303) **FINITE ELEMENT METHODS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*-*	*4*

PRE-REQUISITES:
Engineering Mechanics, Strength of Materials, Design of Machine Elements-I, Design of Machine Elements-II, Heat Transfer, Fluid Mechanics.

COURSE DESCRIPTION:
Fundamentals of finite element analysis including, discrete system analysis, steady state and transient heat transfer analysis; static and dynamic analysis of structures. Modeling, analysis and design using FEM.

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

CO 1: Employ the theoretical knowledge in choosing a proper element type, and boundary conditions to use in a given situation to build a FEM model of a given physical situation.

CO 2: Analyze the physical system under various types of loading (Structural & Thermal) and identify the problem areas and offer probable solutions to design related problems.

CO 3: Identify the interrelationships existing between smaller sub-systems in a large-scale system and thus simplifying the scope of analysis.

UNIT – I:
Introduction to Finite element method for solving field problems, Stress and equilibrium, Strain - Displacement relations, Stress - strain relations.

UNIT – II:
One Dimensional problems: Finite element modeling coordinates and shape functions. Potential Energy approach: Assembly of Global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions, Quadratic shape functions.
Development of Truss Equations: Derivation of stiffness matrix for a beam element in local coordinates, Selecting approximation functions for displacement, Global stiffness matrix, Computation of stress for a bar in x-y Plane, Solution of a plane truss, Potential energy approach to derive bar element equations, Comparison of finite element solution to exact solution for bar, Galerkin's residual method and its use to derive the one-dimensional bar element equation, Other residual methods and their applications to a one-dimensional bar problem.

UNIT – III:
Development of Beam Equations: Beam stiffness, Example of assemblage of beam stiffness matrices, distributed loading, Beam element with nodal hinge, Potential energy approach to derive beam element equations, Galerkin's methods for deriving beam element equations.

UNIT – IV:
Frames, Plane stress and strain equations: Two-dimensional arbitrarily oriented beam element rigid plane frame examples, Grid equations, Basic concepts of plane stress and

plane strain, Derivation of the constant strain triangular element stiffness matrix and equations, Treatment of body and surface forces, Explicit expression for the constant strain triangle stiffness matrix, Finite element solution of a plane stress problem.

UNIT – V:
Development of a linear strain and axisymmetric elements: Introduction, Derivation of the linear strain triangular element stiffness matrix and equations, Example LST stiffness determination, Comparison of elements, Derivation of the stiffness matrix, Solution of an axisymmetric pressure vessels, Isoparametric formulation: Isoparametric formulation of the bar element stiffness matrix, Rectangular plane stress element, Isoparametric formulation of the plane element stiffness matrix, Evaluation of the stiffness matrix and stress matrix by Gaussian quadrature.

UNIT – VI:
Heat and Mass Transfer analysis: Derivation of the basic differential equation, Heat transfer with convection, Typical units of thermal conductivities-K and heat transfer coefficients-h, One-dimensional finite element formulation using a variational method, Two-dimensional finite element formulation, Line or point sources, One-dimensional heat transfer with mass transport, Finite element formulation of heat transfer with mass transport by Galerkin's method, Flow chart and examples of a heat transfer program.

UNIT – VII:
Fluid flow and thermal stress analysis: Derivation of the basic differential equations, One-dimensional finite element formulation, Two-dimensional finite element formulation, Flow chart and examples of a fluid flow program.

UNIT – VIII:
Structural dynamic and time dependent heat transfer: Dynamics of a spring mass system, Direct derivation of the bar element equations, Numerical integration in time, Natural frequencies of a one-dimensional bar, Time dependent one dimensional bar analysis, Beam element mass matrices and natural frequencies, Truss, plane frame, Plane stress/strain, Time-dependent heat transfer.
Dynamic analysis: Formulation of FEM Model, element matrices, Evaluation of eigen values and eigen vectors for a stepped bar and a beam.

TEXT BOOKS
1. Chandraputla, A. and Belegundu, *Introduction to Finite Elements in Engineering,* PHI.
2. S.S. Rao, *Finite Element Methods in Engineering*, Pergamon.
3. Daryl. L. Logan, *A First Course In Finite Element Method*, Cengage Learning.

REFERENCES
1. David. V. Hutton, *Fundamentals Of Finite Element Analysis,* TMH
2. J. N. Reddy, *An Introduction to Finite Element Method*, TMH

IV B. Tech. I Semester

(10BT70304) **PRODUCTION AND OPERATIONS MANAGEMENT**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	***70***	***100***	***4***	***1***	***--***	***4***

PRE-REQUISITES :

Industrial Engineering and Management

COURSE DESCRIPTION:

Overview of production and operations management concepts and issues from both strategic and operational perspective; relationships between operations and environment; analysis of strategic issues relating to competitiveness in production and operations management, and application of tools to improve productivity in production and operations; concepts/principles related to management of operations – forecasting demand; production, material and capacity requirements planning; scheduling; inventory planning and control; lean and supply chain management systems.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: *To understand the relationship of the various planning practices of capacity planning, aggregate planning, project planning and scheduling.*

CO 2: *Analyze the operations of an organization and integrate operations management principles and concepts to assess and improve operational performance.*

CO 3: *Use basic management tools used in planning, scheduling and controlling production processes and costs and establish methods for maximizing productivity.*

CO 4: *Optimize the use of resources which include people, plant, equipment, tools, inventory, premises and information systems.*

CO 5: *Determine the necessary steps to increase the levels of skill, motivation and commitment in the workforce.*

UNIT– I: OPERATIONS MANAGEMENT CONCEPTS

Introduction, Historical development, Information and Non-manufacturing systems, Operations management, Factors affecting productivity, International dimensions of productivity, The environment of operations, Production systems decisions- a look ahead.

UNIT– II: FORECASTING DEMAND

Forecasting objectives and uses, Forecasting variables, Opinion and judgmental methods, Time series methods, Exponential smoothing, Regression and correlation methods, Application and control of forecasts.

UNIT–III: AGGREGATE PRODUCTION PLANNING
Planning hierarchies in operations, Need for aggregate production planning, Alternatives for managing supply and demand, Basic strategies for aggregate production planning – level, Chase and mixed, Aggregate production planning methods, Master production scheduling.

UNIT-IV: MATERIAL AND CAPACITY REQUIREMENTS PLANNING
Overview: MRP and CRP, MRP-underlying concepts, Bill of Material, System parameters, MRP logic, System refinements, Capacity management, CRP activities. Manufacturing Resource Planning, Enterprise Resource Planning

UNIT– V: SINGLE MACHINE SCHEDULING
Concept, Measures of performance, SPT rule, Weighted SPT rule, EDD rule, Minimizing the number of tardy jobs.
FLOW -SHOP SCHEDULING: Introduction, Johnson's rule for 'n' jobs on 2 and 3 machines, CDS heuristic.
JOB-SHOP SHEDULING: Types of schedules, Heuristic procedure, scheduling 2 jobs on 'm' machines.

UNIT – VI: INVENTORY PLANNING AND CONTROL
Reasons for carrying inventory, Types of inventory, Handling uncertainty in demand, Inventory control systems – Continuous review and periodic review systems, Selective control of inventory – ABC classification, Other classification schemes, Inventory planning for single period demand.

UNIT – VII: SUPPLY CHAIN MANAGEMENT
Supply chain components, Supply chain structures, Bullwhip effect, Measures of supply chain performance, Rule of information technology in Supply chain management.

UNIT – VIII: LEAN SYSTEMS
Characteristics of Just-in-Time operations, Pull method of materials flow, Consistently high quality, Small lot sizes, Uniform workstation loads, Standardized components and work methods, Close supplier ties, Flexible workforce, Line flows, Automated production, Preventive maintenance, continuous improvement, Kaizen.

TEXT BOOKS:

1. B.Mahadevan, *Operations Management – Theory and Practice,* Pearson.
2. Everett E. Adam, Ronald J. Ebert, *Production and Operations Management*, PHI.
3. Lee J Krajewski, Larry P Ritzman and M K Malhotra, *Operations management – Processes and Value Chains*, 8th edition, PHI.

REFERENCE BOOKS:

1. Chary, S.N, *Production and Operations Management*, Tata- McGraw Hill.
2. Monks J.G., *Operations Management,* Schaums outline series, McGraw-Hill International Edition.
3. Pannerselvam. R, *Production and Operations Management, PHI*

IV B. Tech. I semester

(10BT70306) **TOOL DESIGN**
(ELECTIVE-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*-*	*4*

PRE-REQUISITES:

Manufacturing technology, Machine tools, Machine tools lab

COURSE DESCRIPTION:

Introduction and study of cutting tools and its design; determination of cutting forces, stresses and strains; comprehensive knowledge and insight into basic cutting parameters, machining and tooling techniques; tooling equipment and machine tool; tooling materials and heat treatment; design of multipoint cutting tools, jigs and fixtures.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: *Specify the basic cutting tool angles.*

CO 2: *Analyze the cutting tool requirement and specify the material and geometry required for a given tool in a given machining situation.*

CO 3: *Design multipoint cutting tools and jigs/fixtures in selected applications.*

CO 4: *Identify the tooling and other requirements for machining an object with complex geometry.*

UNIT – I: TOOLING MATERIALS AND HEAT TREATMENT

Tooling materials and heat treatment: Properties of materials, Ferrous, Nonferrous, Non metallic, tooling materials, Heat treating, Limits, Tolerances, Error Analysis, and Fits, Gauges and gauge design coated tools, Ceramic tools.

UNIT – II: CUTTING TOOLS

Cutting tool classification- nomenclature of single point cutting tool – Difference between Orthogonal and Oblique Cutting – Mechanism of metal cutting, Types of chips – Chip breakers, Forces acting on tool- Merchant circle diagram.

UNIT – III: DESIGN OF MULTIPOINT CUTTING TOOLS

Design of multipoint cutting tools: Drill geometry, Design of drills, Rake & relief angles of twist drill, Speed, Feed and depth of cut, Machining time, Forces, Milling cutters, Cutting speeds and feed-machining times-design-form cutters, Combination tools, Reamers etc.

UNIT – IV: JIGS AND FIXTURES

Design of jigs and fixtures: Basic principles of location and clamping, Locating, Methods and devices, Jigs, Definitions, Types, General consideration in the design of jigs, Drills bushing, Methods of construction, Fixtures-vice fixtures milling, Boring, and lathe grinding fixtures.

UNIT – V: DESIGN OF SHEET METAL BLANKING AND PIERCING

Design of sheet metal blanking and piercing: Fundamentals of die cutting operating, Power press types, General press information, Material handling equipment, Cutting action in punch and die operation, Die clearance, and types of die construction, Die design fundamentals-blanking and piercing die construction, Pilots, striper and pressure pads presswork material, Strip layout, Short run tooling for piercing.

UNIT – VI:

Design of sheet metal bending, Forming and drawings die: Bending dies, Drawing dies, Forming dies, Drawing operations, Variables that effect metal flow during drawing, Determination of blank size, drawing force, Single and double action draw dies.

UNIT – VII:

Tool Wear – Tool life – factors affecting tool life- Taylor's tool life equation- Tool wear mechanisms- Types of tool wear- Heat distribution in metal cutting – Measurement of temperature in metal cutting.

UNIT – VIII:

Using plastics as tooling materials: Introduction, Plastics commonly used as tooling material, Application of epoxy plastic tools, Construction methods of plastic tooling, Metal forming operations with Urethane dies, Calculating forces for urethane pressure pads, Economics of tooling.

TEXT BOOKS:

1. Donaldson, Lecain and Goold, *Tool Design*, Tata McGraw Hill.
2. A Bhattacharya, *Principles of Metal cutting*, New Central Book Agency, Calcutta.
3. *G.R.Nagpal, Tool Engineering and Design, Khanna Publishers, 2004.*

REFERENCE BOOKS:

1. Surendra Kenav and Umesh Chandra, Satyaprakashan, *Production Engineering Design* (*Tool Design*), New Delhi.
2. Amitabha Battacharya and Inyong Ham, *Design of Cutting Tools use of Metal Cutting Theory*, ASTME Publication, Michigan USA.
3. V.Arshinov, G.Alekseev, *Metal Cutting Theory and Cutting Tool Design*, MIR Publications.
4. ASTME Fundamentals of tool design, PHI.
5. P. C. Sharma, Textbook of Machine Tools and Tool Design, S. Chand & Co Ltd

IVB. Tech. I-Semester
(10BT70309) **POWER PLANT ENGINEERING**
(ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*--*	*4*

PRE-REQUISITE:
Thermodynamics, Heat transfer

COURSE DESCRIPTION:
Energy sources; Types of Power Plants; thermal power plant; study of various systems of thermal power plant; Combustion and Firing Methods; Diesel Power plant; Gas Turbine Power Plants; Hydroelectric power Plants and Nuclear power plants; Power generation and recovery systems; various conventional and nonconventional sources of energy with power plant economics.

COURSE OUTCOMES:

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

CO 1: *Employ the knowledge of thermodynamics, fluid mechanics and heat transfer to propose elementary design of power plants.*
CO 2: *Use thermodynamic analysis to derive models of the components to predict the performance of the power plants.*
CO 3: *Suggest suitable type of power plant in a given location considering environmentally safe aspects.*

UNIT – I:
Introduction to the sources of energy – Resources and development of power in India.
STEAM POWER PLANT: Plant layout, Working of different circuits, Fuel and handling equipments, Types of coals, Coal handling, Choice of handling equipment, Coal storage, Ash handling systems.

UNIT – II: STEAM POWER PLANT
Combustion process, Properties of coal – Overfeed and underfeed fuel beds, Traveling 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, Corrosion and feed water treatment.

UNIT – III: INTERNAL COMBUSTION ENGINE PLANT
Diesel power plant: Introduction – IC engines- types- construction– plant layout with auxiliaries – fuel supply system, Air starting equipment, Lubrication and cooling system – super charging.

UNIT – IV: GAS TURBINE PLANT
Introduction – classification - construction – layout with auxiliaries – principles of working of closed and open cycle gas turbines, Combined cycle power plants and comparison.

UNIT – V: 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 – VI: POWER FROM NON-CONVENTIONAL SOURCES
Utilization of solar- collectors- principle of Working, Wind energy – types – HAWT, VAWT -tidal energy.
DIRECT ENERGY CONVERSION: Solar energy, Fuel cells, Thermo electric and Thermo ionic, MHD generation.

UNIT – VII: NUCLEAR POWER STATION
Nuclear fuel – 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.

UNIT – VIII: 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 – related exercises, Effluents from power plants and Impact on environment – pollutants and pollution standards – methods of pollution control.

TEXT BOOKS:

1. Arora and S. Domkundwar, *A Course in Power Plant Engineering*, Dhanpat Rai and Co (P) Ltd.
2. P.C.Sharma, *Power Plant Engineering*, S.K.Kataria Publishing House.

REFERENCE BOOKS:

1. P.K.Nag, *Power Plant Engineering* 2nd edition, TMH.
2. Ramalingam, *Power plant Engineering*, Scitech Publishers.
3. Rajput.R.K, *A text Book of Power Plant Engineering*, Laxmi Publications.
4. C. Elanchezian and others, *Power Plant Engineering*, I.K. International, 2010.

IV B. Tech. II Semester

(10BT80301) **WORLD CLASS MANUFACTURING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*-*	*-*	*4*

PRE-REQUISITES:

Industrial Engineering and Management / Management Science, Manufacturing Systems, Production and Operations Management

COURSE DESCRIPTION:

Fundamentals and philosophy of world class manufacturing, manufacturing models, Balanced score card and bench marking, Reengineering practices through ERP and business intelligence tools, Total quality management, concepts and theories of total quality management, qualify function deployment, quality management systems, ISO standards and certification, six-sigma concepts, integration of lean manufacturing and six-sigma, total productive maintenance-practices and philosophies, measurement of overall equipment effectiveness, implementation steps in productive maintenance, contemporary practices and issues related to world class manufacturing including corporate social responsibility.

COURSE OUTCOMES:

After completion of this course, a successful student will be able to:

CO 1: *Gain fundamental and advanced knowledge on world class manufacturing*

CO 2: *Provide elementary analysis of a manufacturing organization's operations and identify strategies for business excellence, reengineering, total quality management and six-sigma practices*

CO 3: *Identify, where possible, aspects of total productive maintenance in select situations.*

CO 4: *Implement contemporary world class manufacturing practices in the their workplace.*

UNIT – I: GAINING COMPETITIVE EDGE THROUGH WORLD CLASS MANUFACTURING

Manufacturing Excellence and Competitiveness, World Class Manufacturing models, The philosophy of world-class Manufacturing-The First Principles of World-Class Manufacturing, The practices of World-Class Manufacturing-The customers Interface, The Supplier Interface, World-Class Practices in the factory.

UNIT – II: STRATEGIES FOR BUSINESS EXCELLENCE

Balanced scorecard- Sustainable balanced scorecard, Policy deployment, Benchmarking, Value Stream Mapping, Activity Based Costing, Continuous improvement, Innovations.

UNIT – III: REENGINEERING

Definition of Reengineering, importance of 3 Cs – Customers take charge, Competition intensifies and Change becomes constant, Fundamentals of rethinking, radical redesign and dramatic improvement, Rethinking business process: new world of and enabling role of information technology, Enterprise resource planning, Business intelligence tools.

UNIT – IV: TOTAL QUALITY MANAGEMENT
History of TQM, Axioms of TQM, Contribution of Quality Gurus – Deming's approach, Juran's quality trilogy, Crosby and quality treatment, Imai's Kaizen, Ishikawa's company wide quality control, and Feigenbaum's theory of TQC, Four Revolutions in Management thinking; Customer focus, Continuous Improvement, Total participation, and Societal Networking, Focus on customers: Change in work concept, Market-in, and customers, Quality Function Deployment.

UNIT – V: QUALITY MANAGEMENT SYSTEMS
ISO 9000 series of standards, Sector specific standards, Implementation, Documentation, Internal audits, registration, Environment management system – ISO 14000 series standards – integrating ISO 14000 with ISO 9000.

UNIT – VI: SIX SIGMA
Six sigma basics DMAIC Process, Design for Six Sigma (DFSS) and the customer, Quality time and the Bottom line, Core of DFSS - IDOV method, DFSS Metrics, DFSS Infrastructure – People and resources, Implementing DFSS, Integrating lean and six sigma.

UNIT – VII: TOTAL PRODUCTIVE MAINTENANCE
Introduction, The Plan, Learning the New Philosophy, Promoting the Philosophy, Training, Improvement Needs, Goal, Developing Plans, Autonomous work groups maintenance ,Prevention, reducing break down & other losses, Advantages of TPM, Implementing TPM: Integrating TPM into the company, Measuring overall equipment effectiveness (OEE), Framework for TPM implementation, Steps in TPM implementation

UNIT – VIII: CONTEMPORARY TOPICS
Concurrent Engineering(CE) – Introduction, Basic principles, Components of CE models, Benefits, co-operative concurrent teams, Elementary treatment on digital manufacturing, e-manufacturing, reconfigurable manufacturing, Corporate governance, Corporate social responsibility.

TEXT BOOKS:
1. Sahay B S, Saxena K B C, Ashish Kumar, *World Class Manufacturing- A Strategic Perspective,* MacMillan.
2. Hammer, Michael and James Champy, *Reengineering the corporation-A Manifesto for Business revolution*, HarperBusiness London.
3. Dale H. Besterfield, etal, Total Quality Management, Prentice Hall.

REFERENCE BOOKS:
1. Dennis Pascal, *Lean Production Simplified: A Plain Language Guide To The World's Most Powerful Production System*, New York Productivity Press.

IV B. Tech. II semester

(10BT80303) **NON-TRADITIONAL MACHINING PROCESSES**
(ELECTIVE-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*-*	*-*	*4*

PRE-REQUISITES:

Engineering Workshop, Manufacturing Technology, CAD/CAM

COURSE DESCRIPTION:

Introduces various machining operations and study of various process parameters in Non-Traditional machining process; various cutting tools, cutting forces, and surface finish and tool wear mechanisms during machining of metals and non-metals; ultrasonic machining, abrasive jet machining & water jet machining, electro–chemical processes, electron beam machining, plasma arc machining.

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

CO 1: *Choose a non-Traditional machining techniques or non-traditional machining processes to fabricate a part or perform material removal with a given accuracy.*
CO 2: *Estimate the effects of mechanical and thermal loading when machining metal and Non-metal cutting using a non-traditional machining process.*
CO 3: *Estimate the material removal rate and cutting force and the surface finish attainable using a non-traditional machining process and suggest a suitable process for a given application.*
CO 4: *Propose, where possible, environment-friendly and sustainable solutions to suit non-traditional machining processes.*

UNIT – I: INTRODUCTION
Need for non-traditional machining methods, Classification of modern machining processes, Comparative study of different processes, Considerations in process selection, Materials-its applications.

UNIT – II: ULTRASONIC MACHINING
Elements of the process, Mechanics of metal removal process parameters, Tool feed mechanism, Economic considerations, Applications and limitations, Effects of ultrasonic machining on materials.

UNIT – III: ABRASIVE JET MACHINING & WATER JET MACHINING
Basic principles, Types of abrasives, Types of equipments, Process variables, Mechanics of metal removal, Application and limitations.

UNIT – IV: ELECTRO–CHEMICAL PROCESSES
Fundamentals of electro chemical machining, Metal removal rate in ECM, Tools, Surface finish and accuracy, Economic aspects of ECM, Simple problems for estimation of metal

removal rate, Electro Chemical Grinding, Electro Chemical Honing and Deburring process.

UNIT – V: THERMAL METAL REMOVAL PROCESSES
General principle and applications of Electric Discharge Machining, Electric Discharge Grinding and Electric Discharge Wire cutting processes, Power circuits for EDM, Mechanics of metal removal in EDM, process parameters, Selection of tool electrode and dielectric fluids, Methods of surface finish and machining accuracy, Characteristics of spark eroded surface and machine tool selection, Wire EDM-principle & its applications.

UNIT – VI: ELECTRON BEAM MACHINING
Generation and control of electron beam for machining, Theory of electron beam machining, Comparison of thermal and non-thermal processes, Applications, Advantages and limitations.
LASER BEAM MACHINING: General principle and application of laser beam machining, Thermal features, Cutting speed and accuracy of cut, Laser drilling.

UNIT – VI: PLASMA ARC MACHINING
Principle, Metal removal mechanism, Process parameters, Accuracy and surface finish, Applications, Advantages and limitations.
Chemical Machining- Fundamentals of chemical machining- Principle- Maskants – Etchants- Advantages and applications.

UNIT – VIII:
Magnetic abrasive Finishing, Abrasive flow finishing, Electro stream drilling, Shaped tube electrolytic machining.
Rapid Prototyping: Classification – Stereo lithography-selective laser sintering, applications.

TEXT BOOKS:
1. Pandey, P.C. and Shah H.S., *Modern Machining Process*, TMH.
2. V.K. Jain, *Advanced Machining Processes*, Allied publishers.

REFERENCE BOOKS:
1. Bhattacharya A, *New Technology,* The Institution of Engineers, India
2. Kalpakzian, *Manufacturing Technology,* Pearson.

IV B. Tech. II Semester

(10BT80307) **SUPPLY CHAIN MANAGEMENT**

(ELECTIVE-IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	*70*	*100*	*4*	*1*	*-*	*4*

PRE-REQUISITES:

Industrial Engineering and Management / Management Science, Managerial Economics and Financial Analysis, Operations Research

COURSE DESCRIPTION:

Supply chain management fundamentals, Drivers of Supply Chain, Inventory management in a supply chain, Supply chain integration, Demand driven strategies for SCM, Designing and planning transportation networks thorough infrastructure and strategies, Retailer-Supplier partnerships through strategic alliances, International issues in SCM embracing new product development & Customer value and Infrastructure for Information Technology enabled SCM practices and Decision Support Systems for SCM.

COURSE OUTCOMES:

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

CO1. *Employ SCM on firm at an elementary level to improve its performance.*
CO2. *Analyze and identify the key drivers and enablers of SCM for a given firm.*
CO3. *Formulate appropriate and customized strategies & policies in managing supply chains that cater the needs of a particular industry/Organization.*

UNIT – I: INTRODUCTION TO SCM

Definition, Global optimization, Objectives of SCM, What is a Supply Chain?, The Objective of a Supply Chain, The importance of Supply Chain Decisions, Decision Phases in a Supply Chain, Process View of Supply Chains, Importance of supply chain. Competitive and Supply Chain Strategies, Achieving Strategic fit, Expanding Strategic Scope.

UNIT – II: SUPPLY CHAIN DRIVERS

Framework of Supply chain Drivers, Inventory, Facilities, Information, Transportation, Sourcing and Pricing, Obstacles to achieve strategic fit.

UNIT – III: INVENTORY MANAGEMENT

Introduction, Single warehouse, Inventory examples, Economic lot size model, Effect of demand uncertainty, Risk pooling, Centralized and decentralized system, Managing inventory in the supply chain, Forecasting.

UNIT – IV: VALUE OF INFORMATION

Bullwhip effect, Information and supply chain technology, Supply chain integration-push, Pull and push-pull system, Demand driven strategies, Impact of internet on SCM, Distribution strategies.

UNIT – V: DESIGNING AND PLANNING TRANSPORATATION NETWORKS

The role of transportation in a Supply chain, Modes of transportation and their performance characteristics, Transportation infrastructure and policies, Design options for a transportation network, Trade-offs in transportation design, Tailored transportation, The role of IT in transportation, Problems

UNIT – VI: STRATEGIC ALLIANCES

Framework for strategic alliance, Third party logistics, Retailer, Supplies Partnership, Distributor- integration, Procurement and out servicing strategies.

UNIT – VII: INTERNATIONAL ISSUES IN SCM

Introduction, Risks and advantages- design for logistics, Supplies integration into to new product development, Mass customization, Issues in customer value.

UNIT – VIII: INFORMATION TECHNOLOGY FOR SCM

Goals, Standardization, Infrastructure, DSS for supply chain management.

TEXT BOOKS:

1. Sunil Chopra & Peter Meindl, *Supply Chain Management - Strategy, Planning & Operation*, 4rd Edition, Pearson Education Asia.
2. Janat Shah, *Supply Chain Management*, Pearson.

REFERENCE BOOKS:

1. Thomas E Vollman and Clay Whybark D, *Manufacturing Planning and Control for Supply Chain Management*, Tata McGraw Hill, Fifth Edition, New Delhi, 2005
2. Simchi – Levi Davi, Kaminsky Philip and Simchi-Levi Edith, *Designing and Managing the Supply Chain*, Tata McGraw Hill, New Delhi.

III B.Tech. I Semester

10BT50401: ANALOG COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: Courses on Semiconductor Devices and circuits, Signals and Systems.

COURSE DESCRIPTION:

Analog modulations; Modulators and De-Modulators; Transmitters; Receivers and Signal to noise ratio calculations.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate fundamental knowledge in

- Elements of communication systems.
- Amplitude, Frequency, and Phase Modulations
- Amplitude, Frequency, and Phase Modulatiors and De-Modulators .
- Types of noise
- Time Division Multiplexing.
- Frequency Division Multiplexing.

CO2. Perform analysis of different modulations and calculate total power, bandwidth in the modulated wave.

CO3. Design an efficient Transmitter and Receiver Which has High SNR (signal to noise Ratio).

CO4. Formulate and solve technology specific problems in developing Modulators using integrated circuits.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION

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, Switching modulator, Detection of AM Waves- Square law detector, Envelope detector.

UNIT-II: DSB MODULATION

Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSB-SC Waves- Balanced Modulators, Ring Modulator, Detection of DSB-SC Modulated waves- Coherent detector, COSTAS Loop

UNIT-III: SSB & VSB MODULATION

Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT-IV: ANGLE MODULATION
Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT-V: NOISE
Noise in Analog communication System, Signal to Noise ratio in AM, DSB & SSB System, Signal to Noise ratio in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & De-emphasis.

UNIT-VI: TRANSMITTERS
Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feed back on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

UNIT-VII: RECEIVERS
Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT-VIII: PULSE MODULATION
Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM.
MULTIPLEXING:Introduction to multiplexing, Time division multiplexing, Frequency division multiplexing.

TEXT BOOKS:

1. Simon Haykin, *Communication Systems*, 2nd Edition, John Wiley, 1978.
2. B.P. Lathi, *Communication Systems*, BS Publication, 2006.
3. George Kennedy and Bernard Davis, *Electronics & Communication System*, TMH, 2004.

REFERENCE BOOKS:

1. H Taub & D. Schilling, Gautam Sahe, *Principles of Communication Systems*, 3rd Edition, TMH, 2007.
2. R.P. Singh, SP Sapre, *Communication Systems*, 2nd Edition, TMH, 2007.
3. G.K. Mithal, *Radio Engineering*, 20th Edition, Khanna Publishers, 2003.

III B.Tech. I Semester

10BT50402: ANTENNAS AND WAVE PROPAGATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: A Course on Electromagnetic wave and transmission line.

COURSE DISCREPTION:

Antenna parameters; Wire antennas; Antenna arrays; VHF, UHF and Microwave antennas; Antenna measurements; Wave propagation.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate knowledge on the fundamental principles of antenna theory.
CO2. Analyze complex engineering problems critically for conducting research in antennas design.
CO3. Solve engineering problems with wide range of solutions in antennas and wave propagation.
CO4. Apply appropriate techniques, resources and tools to engineering activities in the field of Antenna Design.

DETAILED SYLLABUS :

UNIT-I: ANTENNA BASICS
Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective height, Illustrative problems. Fields from oscillating dipole, Field Zones, Shape-Impedance considerations, Antenna temperature, front–to-back ratio, antenna theorems, radiation- basic Maxwell's equations, retarded potential-Helmholtz Theorem.

UNIT-II: THIN LINEAR WIRE ANTENNAS
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 and patterns of Thin Linear Center-fed Antennas of different lengths, Illustrative problems. Loop Antennas: Introduction, Small Loop, Comparison of far fields of small loop and short dipole, Radiation Resistances and Directives of small and large loops (Qualitative Treatment).

UNIT-III: ANTENNA ARRAYS
Point sources- Definition, Patterns, arrays of 2 Isotropic sources- Different cases. Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison, BSA with Non-uniform Amplitude Distribution - General considerations and Binomial Arrays, Illustrative problems.

UNIT-IV: VHF, UHF AND MICROWAVE ANTENNAS - I
Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas-Helical Geometry, Helix modes, Practical Design considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas- Types, Fermat's Principle, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

UNIT-V: VHF, UHF AND MICROWAVE ANTENNAS - II

Microstrip Antennas- Introduction, features, advantages and limitations, Rectangular patch antennas- Geometry and parameters, characteristics of Microstrip antennas, Impact of different parameters on characteristics, reflector antennas- Introduction, Flat sheet and corner reflectors, paraboloidal reflectors- geometry, pattern characteristics, Feed Methods, Reflector Types- Related Features, Illustrative Problems.

UNIT-VI: LENS ANTENNAS
Introduction, Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications.
ANTENNA MEASUREMENTS: Introduction, Concepts- Reciprocity, Near and Far Fields, Coordination system, sources of errors, Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement , Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

UNIT-VII: WAVE PROPAGATION - I
Introduction, Definitions, Characterizations and general classifications, different modes of wave propagation, Ray/ Mode concepts. Ground wave propagation (Qualitative treatment)- Introduction, Plane earth reflections, Space and surface waves, wave tilt, curved earth reflections. Space wave propagation- Introduction, field strength variation with distance and height, effect of earth's curvature, absorption. Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, fading and path loss calculations.

UNIT-VIII: WAVE PROPAGATION – II
Sky wave propagation- Introduction, structure of Ionosphere, refraction and reflection of sky waves by Ionosphere, Ray path, Critical frequency, MUF, LUF, OF, Virtual height and Skip distance, Relation between MUF and Skip distance, Multi-HOP propagation, Energy loss in Ionosphere, Summary of Wave Characteristics in different frequency ranges.

TEXT BOOKS:
1. John D. Kraus and Ronald J. Marhefka and Ahmad S.Khan, *Antennas and wave propagation,* 4th Edition (special Indian Edition), TMH, New Delhi, 2010.
2. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems,* 2nd Edition, PHI, 2000.

REFERENCE BOOKS:
1. C.A. Balanis, *Antenna Theory*, 2nd Edition, John Wiley & Sons, 2001.
2. K.D. Prasad, Satya Prakashan, *Antennas and Wave Propagation*, Tech India Publications, New Delhi, 2001.
3. E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, *Transmission and Propagation*, vol.5, Standard Publishers Distributors, Delhi.
4. F.E. Terman, *Electronic and Radio Engineering*, 4th Edition, McGraw-Hill, 1955.
5. John D. Kraus, *Antennas*, 2nd Edition, McGraw-Hill (International Edition), 1988.

III B.Tech. I Semester

10BT50403: LINEAR IC APPLICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Course on Semiconductor Devices and Circuits and Electronic Circuit Analysis.

COURSE DESCRIPTION:

Operational Amplifiers (Op-Amp) basics and its characteristics, study of Op-Amp Linear and Non Linear Applications, Designing of Filter circuits, study of internal functional blocks and the applications of special ICs like Timers, PLL circuits, DACs /ADCs, Analog Multipliers and Modulators.

COURSE OUTCOMES*:* On completion of the course, the students will be able to

CO1. Demonstrate knowledge in

- Op-Amp IC application.
- 555 Timer applications.
- PLL applications.

CO2. Analyze Op-Amp circuits and evaluate its Gain, Bandwidth, Input and Output impedances.

CO3. Design and Develop Linear ICs subsystems and systems.

CO4. Solve engineering problems by proposing potential solutions leading to design better Linear ICs.

DETAILED SYLLABUS :

UNIT-I: INTEGRATED CIRCUITS
Differential amplifier –DC and AC analysis of Dual input balanced output configuration, Properties of other differential amplifier configuration (dual input unbalanced output, single ended input-balanced/unbalanced output), DC coupling and cascade differential amplifier stages, Level Translator.

UNIT-II:
Characteristics of OP-Amps, integrated circuits-types, classification, package types and temperature ranges, power supplies, OP-Amp Block diagram, ideal and practical OP-Amp specifications, DC and AC characteristics, 741 OP-Amp and its features, FET input OP-Amps, OP-Amp parameters and measurement, input and output offset voltages and currents, slew rate, CMRR, PSRR, drift, Frequency compensation technique.

UNIT-III: LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIER
Inverting and non-inverting amplifier, integrator and differentiator, difference amplifier, instrumentation amplifier, AC amplifier, V-I, I-V converters, Buffers.

UNIT-IV: NON - LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIER
Non-linear function generation, comparators, Multivibrators, Triangular and square wave generators, Log and antilog amplifiers, precision rectifiers.

UNIT-V: ANALOG FILTERS

Introduction, Butterworth filters-first order, second order Low Pass, High Pass, Band pass, Band reject and all pass filters.

UNIT-VI: TIMERS AND PHASE LOCKED LOOPS
Introduction to 555 Timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL-Introduction, Block schematic, principles and description of individual blocks,565 PLL, applications of PLL-Frequency multiplication, frequency translation, AM, FM and FSK demodulators.

UNIT–VII: D/A AND A/D CONVERTERS
Introduction, Basic DAC techniques, weighted resistor DAC, R-2R Ladder DAC, Inverted R-2R DAC and IC 1408 DAC, different types of ADCs-parallel comparator type ADC, counter type ADC, successive approximation ADC and Dual slope ADC. DAC and ADC specifications, specifications of AD 574 (12 bit ADC).

UNIT-VIII: ANALOG MULTIPLIERS AND MODULATORS
Four quadrant multiplier, Balanced modulator, IC 1496, applications of analog switches and multiplexers, sample and hold amplifiers.

TEXT BOOKS:
1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs,* 2nd Edition, PHI, 1987.
2. D. Roy Chowdhury, *Linear Integrated Circuits,* 2nd Edition, New Age International (p) Ltd, 2003.

REFERENCE BOOKS:
1. David A. Bell, *Operational Amplifiers & Linear ICs,* 2nd Edition, Oxford University Press, 2010.
2. R.F.Coughlin & Fredrick Driscoll, *Operational Amplifiers & Linear Integrated Circuits,* 6th Edition, PHI, 2001.
3. Sergio Franco, *Design with Operational Amplifiers & Analog Integrated Circuits,* McGraw Hill, 1988.

III B.Tech. I Semester

10BT50404: DIGITAL IC APPLICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Switching Theory and Logic Design, Semiconductor Devices and Circuits.

COURSE DESCRIPTION:

Logic Families – Bipolar, CMOS and its Interfacing; VHDL Language Design Flow and Elements; IC Level Combinational and Sequential Logic Design and Modeling; Memories.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate fundamental knowledge in

- Classification of Integrated Circuits.
- Characteristics of ICs.
- TTL, ECL and MOS Logic families.
- Interfacing between different Logic Families.
- Design Combinational and Sequential circuits using Digital ICs such as 74XX, 40XX IC's and model them in different modeling styles in VHDL.
- Identify various types of memories and their interfacing.

CO2. Perform analysis of any Small Scale or Medium Scale Integrated Circuit.

CO3. Design and develop circuits from simple design like adders to complex designs like interfacing memories.

CO4. Solve problems arising due to poor interfacing between ICs by choosing the appropriate IC to develop complex designs.

DETAILED SYLLABUS :

UNIT-I: CMOS LOGIC
Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT-II: BIPOLAR LOGIC AND INTERFACING
Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT-III: THE VHDL HARDWARE DESCRIPTION LANGUAGE
Design flow, program structure, types and constants, functions and procedures, libraries and packages.

UNIT-IV: THE VHDL DESIGN ELEMENTS
Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT-V: COMBINATIONAL LOGIC DESIGN

Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT-VI: DESIGN EXAMPLES (USING VHDL)
Design examples (using VHDL) - Barrel shifter, comparators, floating-point encoder, dual parity encoder.

UNIT-VII: SEQUENTIAL LOGIC DESIGN
Latches and flip-flops, PLDs, counters, shift registers, and their VHDL models, synchronous design methodology, impediments to synchronous design.

UNIT-VIII: MEMORIES
ROM: Internal structure, 2D-decoding commercial types, timing and applications.
Static RAM: Internal structure, SRAM timing, standard SRAM, synchronous SRAM.
Dynamic RAM: Internal structure, timing, synchronous DRAM. Familiarity with Component Data Sheets – Cypress CY6116, CY7C1006, Specifications.

TEXT BOOKS:

1. John F. Wakerly, *Digital Design Principles & Practices,* 3rd Edition, PHI/ Pearson Education, Asia, 2005.
2. J. Bhasker, *A VHDL Primer*, 3rd Edition, Pearson Education/ PHI.

REFERENCE BOOKS:

1. Charles H. Roth Jr., *Digital System Design Using VHDL*, 2nd Edition, PWS Publications, 2008.
2. Stephen Borwn and Zvonko Vramesic, *Fundamentals of Digital Logic with VHDL Design*, 2nd Edition, McGraw Hill, 2005.

III B.Tech. II Semester

10BT60401: DIGITAL SIGNAL PROCESSING

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE REQUISITE: A Course on Signals and Systems.

COURSE DESCRIPTION:

Continuous and discrete signals, sequences and systems**;** DFT and FFT algorithms for the analysis of discrete sequences design and realization of Digital IIR and FIR filters; Multirate systems; Signal processing applications.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate knowledge in

- Digital signals, sequences and systems.
- DFT and FFT transforms.
- Analog & Digital Design.
- Digital Filter Realization.
- Multirate systems.

CO2. Analyze the real time situations and requirements to design an appropriate digital filer in suppressing unnecessary frequency components and smoothening the signals.

CO3. Design and develop digital filters and multi rate system to optimize system performance.

CO4. Solve problems in processing of signals through digital systems using frequency domain, digital filters and multirate systems.

CO5. Apply appropriate techniques to engineering activities in processing signals through digital systems.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION TO DIGITAL SIGNAL PROCESSING
Discrete-time signals and sequences, Linear shift invariant systems, Stability and Causality, Linear constant coefficient difference equations. Frequency domain representation of discrete-time signals and systems.

UNIT-II: DISCRETE FOURIER SERIES
DFS representation of periodic sequences, properties of Discrete Fourier Series. Discrete Fourier Transforms: properties of DFT, Linear convolution of sequences using DFT, Computation of DFT. Relation between Z-Transforms and DFS.

UNIT-III: FAST FOURIER TRANSFORMS
Fast Fourier transforms (FFT): Radix-2 Decimation in time (DIT) and Decimation in frequency (DIF), FFT algorithms, Inverse FFT and FFT for composite N.

UNIT-IV: REALIZATION OF DIGITAL FILTERS

Review of Z-transforms, Applications of Z-Transforms, Solution for difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations. Basic structures of IIR systems, Transposed forms. Basic structures of FIR systems, System function.

UNIT-V: IIR DIGITAL FILTERS
Introduction to analog and digital filters, Analog filter approximations-Butterworth and chebyshev, Design of IIR digital filters from analog filters, Design examples: analog-digital transformations.

UNIT-VI: FIR DIGITAL FILTERS
Characteristics of FIR digital filters, Frequency response. Design of FIR digital filters using windowing techniques, Frequency sampling technique, Comparison of IIR and FIR filters.

UNIT-VII: MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS
Basic sample rate alteration devices, Decimation, Interpolation, Sampling rate conversion, Implementation of sampling rate conversion, Multistage design of decimator and Interpolator.

UNIT-VIII: APPLICATIONS OF DIGITAL SIGNAL PROCESSING
Spectral analysis of nonstationary Signals, Musical sound processing, Signal Compression, Transmultiplexers, Discrete multitone transmission of digital data.

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis, *Digital signal processing, principles, Algorithms and applications,* 4th Edition, Pearson Education/PHI, 2007.
2. A.V. Oppenheim and R.W. Schaffer, *Discrete Time Signal Processing,* 2nd Edition, PHI, 2006.
3. Sanjit K Mitra, *Digital signal processing, A computer base approach,* 3rd Edition, TMH, 2009.

REFERENCE BOOKS:

1. S Salivahana, A Vallavaraj, C Gnanapriya, *Digital Signal Processing,* TMH, 2005.
2. Andreas Antoniou, *Digital signal processing,* TMH, 2006.

III B.Tech. II Semester

10BT60402: DIGITAL COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on analog communications, probability and stochastic processes.

COURSE DESCRIPTION:

Digitization techniques - PCM, DPCM, Delta modulation and Adaptive delta modulation; Digital modulation techniques; Detection of baseband signals; Channel coding.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge in

- Digitization techniques
- Digital modulation techniques
- Data transmission and detection of digital signals
- Coding techniques.

CO2. Analyze complex engineering problems critically in the domain of digital communications and systems for conducting research.

CO3. Design and develop digital communication system.

CO4. Solve engineering problems for feasible and optimal solutions in the core area of digital communications and systems.

DETAILED SYLLABUS :

UNIT-I: PULSE DIGITAL MODULATION
Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems, Electrical Representation of binary signals, Differential PCM systems (DPCM).

UNIT-II: DELTA MODULATION
Delta modulation and its drawbacks, Adaptive Delta modulation, comparison of PCM and DM systems, SNR in PCM and DM systems.

UNIT-III: DIGITAL MODULATION TECHNIQUES
Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary schemes: PSK, ASK, FSK. Similarity of BFSK and BPSK.

UNIT-IV: DATA TRANSMISSION
Base band signal receiver, probability of error, the optimum filter, White noise: matched filter, probability of error using matched filter, coherent reception: correlation, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK, QPSK.

UNIT-V: INFORMATION THEORY
Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties.

UNIT-VI: SOURCE CODING

Introduction, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT-VII: LINEAR BLOCK CODES

Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

UNIT-VIII: CONVOLUTIONAL CODES

Introduction, encoding of convolutional codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOKS:

1. H. Taub and D. Schilling, *Principles of Communication Systems,* 2nd Edition, TMH, 2003.
2. Simon Haykin, *Digital communications,* John Wiley, 2005.
3. B.P.Lathi, *Modern Analog and Digital Communication,* 3rd Edition, Oxford reprint, 2004.

REFERENCE BOOKS:

1. R.P. Singh and S D Sapre, *Communication Systems Analog and Digital,* 2nd Edition, TMH, 2004.
2. Sam Shanmugam, *Digital and Analog Communication Systems,* John Wiley, 2005.
3. John Proakis, *Digital Communications,* 3rd Edition, TMH, 1983.
4. Bernard Sklar, Pabitra Kumar Ray, *Digital Communications Fundamentals and Applications,* 2nd Edition, Pearson Education, 2001.

III B.Tech. II Semester

10BT60403: MICROWAVE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A course on Electromagnetic Waves and Transmission Lines.

COURSE DESCRIPTION:

Rectangular waveguides and its characteristics; Strip lines and Micro-strip lines; Waveguide components; Microwave tubes; Microwave solid state devices; and Microwave measurements.

COURSE OUTCOMES: After completion of the course, students should be able to:

1. Demonstrate knowledge in
   - Waveguides
   - Microwave Components
   - Microwave Tubes
   - Microwave Measurements
2. Perform analysis mathematically the operation and working of the various tubes. Quantify the signal and noise characteristics of microwave systems such as communication networks, Radars, and Radiometers and relate this to the design process.
3. Design microwave components such as power dividers, hybrid junctions, microwave filters, ferrite devices, and single stage microwave transistor amplifier.
4. Solve problems in effects of noise on microwave systems.

DETAILED SYLLABUS :

UNIT-I: MICROWAVE TRANSMISSION LINES - I
Introduction, Microwave spectrum and bands, applications of Microwaves. Rectangular Waveguides-Solution of Wave Equation in Rectangular Coordinates, TE and TM mode analysis, Expressions for fields, Characteristic equation and cutoff frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross section. Mode characteristics - Phase and Group velocities, wavelengths and impedance relations, Illustrative Problems.

UNIT-II: MICROWAVE TRANSMISSION LINES - II
Rectangular Waveguides – Power Transmission and Power Losses, Impossibility of TEM Modes, Micro strip lines-introduction, Z_0 relations, effective dielectric constant, losses, Q-factor, Cavity resonators-introduction, Rectangular cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients, Illustrative Problems.

UNIT-III: WAVEGUIDE COMPONENTS AND APPLICATIONS- I
Coupling mechanisms- probe, loop, aperture types. Waveguide discontinuities - waveguide Windows, tuning screws and posts, matched loads. Waveguide attenuators - resistive card, rotary vane Attenuators, waveguide phase shifters-dielectric, rotary vane phase shifters. Waveguide multiport junctions-E plane and H plane Tees, Magic Tee, Directional couplers-2 hole, Bath hole types, Illustrative Problems.

UNIT-IV: WAVEGUIDE COMPONENTS AND APPLICATIONS-II

Ferrites-composition and characteristics, Faraday rotation, Ferrite components-Gyrator, Isolator and Circulator. Scattering Matrix-Significance, Formulation and properties. S Matrix calculations for 2-port junction, E plane and H plane Tees, Magic Tee, Directional coupler, circulator and Isolator, Illustrative Problems.

UNIT-V: MICROWAVE TUBES-I

Limitations and losses of conventional tubes at microwave frequencies. Microwave tubes-O type and M type classifications.

O TYPE TUBES: 2 cavity klystrons-structure, Reentrant cavities, velocity modulation process and Applegate diagram, bunching process and small signal theory-Expressions for O/P power and efficiency. Reflex Klystrons-structure, Velocity Modulation, Applegate diagram, mathematical theory of bunching, power output, efficiency, oscillating modes and O/P characteristics, Effect of Repeller Voltage on Power O/P, Illustrative Problems.

UNIT-VI: MICROWAVE TUBES-II

HELIX TWTs: Significance, types and characteristics of slow wave structures; structure of TWT and amplification process (qualitative treatment), suppression of oscillations, gain considerations.

M -TYPE TUBES: Introduction, cross field effects, Magnetrons-different types, cylindrical travelling wave magnetron-Hull cutoff and Hartree conditions, modes of resonance and PI-mode operation, separation of PI-mode, O/P characteristics, Illustrative Problems.

UNIT-VII: MICROWAVE SOLID STATE DEVICES

Introduction, classification, applications, Transfer Electronic Devices, Gunn diode - principles, RWH theory, characteristics, basic modes of operation - Gunn oscillation modes. LSA Mode, Varactor Diode, Parametric Amplifier, Introduction to Avalanche Transit time devices (brief treatment only).

UNIT-VIII: MICROWAVE MEASUREMENTS

Description of Microwave bench-different blocks and their features, errors and precautions; Microwave power measurement-Bolometer method, Measurement of attenuation, frequency, low and high VSWR, Q of the cavity and impedance measurements.

TEXT BOOKS:

1. Samuel Y. Liao, *Microwave devices and circuits*, 3^{rd} Edition, Pearson Education, 2003.
2. Herbert J.Reich, J.G.Skalnik, P.F.Ordung and H.L.Krauss, *Microwave principles*, CBS publishers and distributors, New Delhi, 2004.

REFERENCE BOOKS:

1. R.E.Collin, *Foundations for Microwave Engineering,* 2^{nd} Edition, IEEE Press, John Wiley, 2002.
2. M.L.Sisodia and G. S. Raghuvanshi, *Microwave circuits and Passive Devices*, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Peter A. Rizzi, *Microwave Engineering Passive Circuits*, PHI, 1999.
4. F. E. Terman, *Electronic and Radio Engineering*, 4^{th} Edition, McGraw-Hill, 1995.
5. A. Das, *Microwave Engineering*, 2^{nd} Edition, TMH, 2009.

III B.Tech. II Semester

10BT60404: MICROPROCESSORS AND MICROCONTROLLERS

(Common to ECE, EEE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Digital Logic Design, Computer Organization.

COURSE DESCRIPTION:

Intel 8085, 8086 & 8031/51- Architectures, Instruction set; Programmable Interfacing Concepts; Serial Communication; Advanced peripheral Interfacing; Applications.

Course Outcomes: After completion of the course, students will be able to:

CO1. Demonstrate knowledge in

- Internal hardware details of Intel 8085,8086,8051
- Interfacing various peripherals to build stand alone systems.

CO2. Critically analyze various interfacing methods.

CO3. Design and develop microcomputer based system to suit a particular application.

CO4. Choose suitable Hardware and software components of a system that work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS :

UNIT-I: 8085 ARCHITECTURE
Microprocessor evolution and types, introduction to 8085 architecture, register organization, pin description, instruction set (briefly), simple programs, interrupts of 8085, interfacing I/O devices using memory mapped I/O and I/O mapped I/O.

UNIT-II: 8086 ARCHITECTURE
Architecture of 8086 microprocessor, register organization, special functions of general purpose registers, memory segmentation, pin description, minimum and maximum mode operation of 8086, timing diagram.

UNIT-III: 8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES
Machine language instruction formats, addressing modes, instruction set of 8086, assembler directives, simple programs - procedures and macros.

UNIT-IV: PROGRAMMABLE INTERFACING DEVICES
Types of data communication, serial and parallel, methods of parallel data transfer, 8255A (programmable peripheral interface) internal block diagram, operational modes and initialization, interface of I/O devices: A/D, D/A, key board, stepper motor.

UNIT-V: SERIAL DATA COMMUNICATION
Types of serial data transmission, synchronous and asynchronous, 8251 (USART), simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standard, RS232C, RS232C to TTL and TTL to RS232C conversion, USB.

UNIT-VI: INTERFACING WITH ADVANCED DEVICES

Memory (static RAM and EPROM) and I/O interfacing with 8086, 8257 (DMA controller), interrupt structure, interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT-VII: 8051 MICROCONTROLLER
Architecture of 8051 microcontroller, internal and external memories, addressing modes and instruction set of 8051, simple programs using 8051.

UNIT-VIII: 8051 INTERRUPTS, COMMUNICATION AND APPLICATIONS
Interrupts, timers/counters and serial communication, programming of interrupts, timers/counters and serial communication interrupts. Interfacing LEDs, seven segment display.

TEXT BOOKS:

1. Douglas V.Hall, *Microprocessors and Interfacing: Programming and Hardware,* revised 2^{nd} Edition, TMH.
2. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, PHI, 2000.

REFERENCE BOOKS:

1. Ramesh S. Goankar, *Microprocessor- Architecture, Programming and Applications with the 8085*, 5^{th} edition, Penram International publishing private limited.
2. A.K. Ray & K.M.Bhurchandi, A*dvanced Microprocessors and Peripherals- Architecture, Programming and Interfacing,* TMH, 2002 reprint.
3. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086/8088 Family architecture, Programming and Design,* PHI, 2006.

III B.Tech. II Semester

10BT60405: VLSI DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Switching Theory and Logic Design and Digital ICs and their Applications.

COURSE DESCRIPTION:

Introduction to the design and implementation of VLSI circuits for complex digital systems; CMOS technology; submicron design; clocking; subsystem design; CAD tools and algorithms; simulation; verification; testing and design methodology.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstarte knowledge in

- Understanding the Fabrication of MOS Transistors.
- Electrical properties of CMOS and BiCMOS Circuits
- Designing Static Combinational and Sequential logic at transistor level, including Mask layout.
- Estimating and optimizing combinational RC Circuit delay using RC delay models and logical effort.
- Design methodology and tools.
- Testing the chip at various abstraction levels.

CO2. Perform analysis of Circuit Characterization and Performance Estimation of CMOS device and Create models of moderately sized CMOS circuits that realize specified digital functions.

CO3. Formulate and solve technology specific problems in developing an IC circuit using EDA tools.

CO4. Use modern design tools to IC devices to create system- on - chip (SOC) designs in FPGAs.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION
Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

UNIT-II: BASIC ELECTRICAL PROPERTIES
Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, figure of merit, Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-III: VLSI CIRCUIT DESIGN PROCESSES
VLSI design flow, MOS layers, Stick diagrams, Design rules and Layout, 2 micron CMOS design rules for Wires, Contacts and Transistors, Layout diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-IV: GATE LEVEL DESIGN
Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

UNIT-V: SUBSYSTEM DESIGN
Adders – Transmission based Adder, Carry Bypass Adder, Carry Skip Adder, Carry Select Adder, Shifters- Barrel Shifter, Logarithmic Shifter, Multipliers – Definitions, Array Multiplier, Carry Save multiplier, Booth Multiplier, ALUs, Parity generators, Comparators, Zero/One Detectors, Counters- Synchronous & Asynchronous Counter, High Density Memory Elements.

UNIT-VI: SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN
PLAs, FPGAs, CPLDs, PALs, Cell based Design Methodology, Design Approach.

UNIT-VII: VHDL SYNTHESIS
VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Types of Simulation, Layout Synthesis, Design capture tools, Design Verification Tools.

UNIT-VIII: CMOS TESTING
CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, *Essentials of VLSI Circuits and Systems,* PHI, 2005 Edition.
2. Weste and EShraghian, *Principles of CMOS VLSI Design,* Pearson Education, 1999.

REFERENCE BOOKS:

1. John M. Rabaey, *Digital Integrated Circuits: A Design Perspective,* 2nd Edition, PHI, EEE, 1997.
2. Wayne wolf, *Modern VLSI Design,* 3rd Edition, Pearson Education, 1997.
3. Charles H. Roth, *Fundamentals of Logic Design,* 5th Edition, Thomson Publications, 2004.

IV B.Tech. I Semester

10BT70401: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Linear and Digital IC Applications.

COURSE DESCRIPTION:

To study Performance characteristics of Instruments, Indicators, Signal Generators, Analyzers, Oscilloscopes; Data Acquisition System and Computer Controlled Test Systems; Analysis of AC and DC Bridges.

COURSE OUTCOMES: On successful completion of the course, the students will be able to

CO1. Demonstrate knowledge in

- Working of Instruments.
- Various measurement techniques available.
- Errors in measurements and their rectification.

CO2. Analyze parameters measuring methods and evaluate errors involved in measurement

CO3. Solve engineering problems by proposing potential solutions leading to better instruments designs.

DETAILED SYLLABUS :

UNIT-I: PERFORMANCE CHARACTERISTICS OF INSTRUMENTS
Static characteristics, Accuracy, Precision, Resolution, Sensitivity, Errors in measurement, Dynamic Characteristics-speed of response, fidelity, lag and dynamic error, Statistical Analysis.
INDICATORS: Basic meter movement, DC voltmeters-multirange, range extension, Loading, Transistor Voltmeter, Solid State Voltmeter, AC voltmeters –using rectifiers, Multirange, range extension, Ammeters- Multirange, Universal Shunt, Extending Ranges, Thermocouple type RF ammeter, ohmmeters, series type and shunt type, Calibration of DC Instrument & Ohmmeter, Multimeter for Voltage, Current and Resistance measurements.

UNIT-II: SIGNAL GENERATORS
Fixed and Variable AF oscillators, Standard Signal Generator, AF Sine & Square wave Generator, Function Generators-Square & Pulse, Random noise, Sweep, and Arbitrary waveform generators specifications and principles of working (Block diagram approach).

UNIT-III: ANALYZERS
Wave analyzers, Harmonic distortion analyzers, Spectrum analyzers, Digital Fourier analyzers, and Logic analyzers.

UNIT-IV: OSCILLOSCOPES
Standard specifications of CRO, CRT features, Vertical and Horizontal amplifiers, Horizontal and Vertical deflection systems, Triggered Sweep CRO, and Delayed sweep, sync selector circuits, probes for CRO – active, passive, and attenuator type, Dual Beam & Trace CRO, Measurement of amplitude, frequency and phase (Lissajous method).

UNIT-V: OSCILLOSCOPE TYPES
Sampling oscilloscope, Storage oscilloscope, Digital readout Oscilloscope, Digital storage oscilloscope, Digital frequency counter, time and phase measurement.

UNIT-VI:
DC BRIDGES: Wheatstone bridge, Wein bridge.
AC BRIDGES: Maxwell's bridge, Anderson bridge. Measurement of capacitance- Schearing bridge. Kelvin bridge, Errors and precautions in using bridges. Q-meter, EMI and EMC, Interference and noise reduction techniques.

UNIT-VII: SENSORS AND TRANSDUCERS
Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples, and Thermistors), Velocity, Acceleration, Vibration, pH measurement.

UNIT-VIII: DATA ACQUISITION SYSTEM
Generalized Data Acquisition System, Signal Conditioning, Single & Multi Channel DAS.
COMPUTER CONTROLLED TEST SYSTEMS: Testing an Audio Amplifier, Testing a Radio Receiver, Instruments used in Computer Controlled Instrumentation.

TEXT BOOKS:

1. H.S.Kalsi, *Electronic instrumentation,* 2nd Edition, TMH, 2004.
2. A.D. Helfrick and W.D. Cooper, *Modern Electronic Instrumentation and Measurement Techniques,* 5th Edition, PHI, 2002.
3. David A. Bell, *Electronic Instrumentation & Measurements,* 2nd Edition, PHI, 2003.

REFERENCE BOOKS:

1. Ernest O Doebelin and Dhanesh N Manik, *Measurement Systems Application and Design,* 5th Edition, TMH, 2009.
2. Oliver and Cage, *Electronic Measurement and Instrumentation,* TMH.
3. Robert A.Witte, *Electronic Test Instruments, Analog and Digital Measurements,* 2nd Edition, Pearson Education, 2004.
4. K. Lal Kishore, *Electronic Measurements & Instrumentations,* Pearson Education, 2005.

IV B.Tech. I Semester

10BT70402: DIGITAL IMAGE PROCESSING

(Common to ECE, EIE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Digital signal processing, Digital communications.

COURSE DESCRIPTION:

Fundamentals of digital image processing, Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques for degraded images, image segmentation techniques; Image compression techniques and color image processing.

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

CO1. Demonstrate knowledge in

- Image Fundamentals
- Image Enhancement & Restoration Techniques
- Image Segmentation & Compression Techniques
- Color image processing

CO2. Analyze complex engineering problems critically in the domain of Image Processing for conducting research.

CO3. Develop various image processing techniques related to image enhancement, restoration, Segmentation and compression.

CO4. Solve engineering problems for feasible and optimal solutions in the core area of Image Processing.

DETAILED SYLLABUS :

UNIT-I: DIGITAL IMAGE FUNDAMENTALS
Image sensing and acquisition, Image sampling & quantization, some basic relationships between pixels. Mathematical tools used in digital image processing – array Vs matrix operations, linear Vs non linear operations, Arithmetic operations, Set and Logical operations, Spatial operations, vector and matrix operations, Probabilistic methods.

UNIT-II: IMAGE TRANSFORMS
2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT-III: IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN
Basic Intensity transformation functions, Histogram processing, Fundamentals of Spatial Filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods.

UNIT-IV: IMAGE ENHANCEMENT IN FREQUENCY DOMAIN
Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-V: IMAGE RESTORATION

Noise models, Restoration in the presence of Noise only-spatial filtering - mean, order- statistic and adaptive filters, Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT-VI: IMAGE SEGMENTATION
Point, line and edge Detection, Thresholding, Region based Segmentation, The use of motion in Segmentation.

UNIT-VII: IMAGE COMPRESSION
Need for Image Compression, Classification of redundancy in Images, Image Compression models, Classification of image compression schemes, Run length coding, Arithmetic coding, Block truncation coding, Dictionary based compression, Transform based compression, Image compression standards.

UNIT-VIII: COLOR IMAGE PROCESSING
Color models, Pseudo color image processing, Color transformations, Smoothing and Sharpening, Image segmentation based on color.

TEXT BOOKS:

1. R. C .Gonzalez & R.E. Woods, *Digital Image Processing,* 2^{nd} Edition, Addison Wesley/Pearson Education, 2002.
2. Malay K. Pakhira, *Digital Image processing and Pattern Recognition,* PHI, 2011.

REFERENCE BOOKS:

1. Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, *Digital Image processing using MATLAB,* TMH, 2010.
2. S jayaraman, S Esakkirajan, T Veerakumar, *Digital Image processing,* TMH.
3. A .K. Jain, *Fundamentals of Digital Image processing,* PHI.

IV B.Tech. I Semester

10BT70407: OPTICAL COMMUNICATIONS

(Elective - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE REQUISITE: Courses on Engineering Physics, Semiconductor Devices and Circuits, Microwave Engineering.

COURSE DESCRIPTION:

Ray theory; single mode fibers; fiber materials; fiber losses; Optical sources and detectors; power launching in to the fiber; optical links; WDM.

COURSE OUTCOMES: On successful completion of the course, the students will be able to:

CO1. Demonstrate knowledge in fibers, optical sources and detectors, power launching and coupling, links and WDM.
CO2. Perform analysis on single & multimode fibers and analog & digital links.
CO3. Design and develop Optical sources, Detectors and links.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION TO OPTICAL FIBER WAVEGUIDES
Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory Transmission, Electromagnetic Mode Theory for Optical Propagation, Cylindrical Fiber.

UNIT-II:
Single Mode Fibers, Fiber Materials, Fiber Fabrication, Mechanical Properties of Fibers, Fiber Optic Cables.

UNIT-III: FIBER LOSSES
Attenuation, Absorption, Scattering, Bending and Core & Cladding losses. Signal Distortion in Fibers - Pulse Broadening.
Dispersion: Intramodal Dispersion, Intermodal Dispersion, Overall Fiber Dispersion in Multi Mode and Single Mode Fibers. Polarization.

UNIT-IV: OPTICAL SOURCES
LIGHT EMITTING DIODES (LEDs): LED Structures, Light Source Materials, Quantum Efficiency and LED Power, Modulation of LED.
LASER DIODES: Laser Diode Modes and Threshold Conditions, Laser Diode Rate Equations, External Quantum Efficiencies, Resonant Frequencies.

UNIT-V: POWER LAUNCHING AND COUPLING
Source to Fiber Power Launching, Lensing Schemes for Coupling Improvement, Fiber-to-Fiber Joints, Fiber alignment and joint loss, LED coupling to single mode fibers, Fiber Splices, Fiber Connectors.

UNIT-VI: OPTICAL DETECTORS
Physical Principles of Photo Diodes, Photo Detector Noise, Detector Response Time, Avalanche Multiplication Noise, Structures for InGaAs & APDs, Temperature Effect on Avalanche Gain, Comparisons of Photo Detectors.

UNIT-VII:
DIGITAL LINKS: Point-to-Point Links, Power Penalties, Error Control.

ANALOG LINKS: Overview, Carrier to Noise Ratio, Multi-channel Transmission Techniques, RF over Fiber, Radio over Fiber Links.

UNIT-VIII: WDM CONCEPTS AND COMPONENTS

Overview, Passive Optical Couplers, Isolators & Circulators, Fiber Grating Filters, Dielectric Thin Film Filters, Phased Array based Devices, Diffraction Gratings, Active Optical Components, Tunable Light Sources.

TEXT BOOKS:

1. Gerd keiser, *Optical Fiber Communications,* 4th Edition, McGraw Hill International, 2010.
2. John M. Senior, *Optical Fiber Communications,* 3rd Edition, PHI, 2010.

REFERENCE BOOKS:

1. Max Ming-Kang Liu, *Principles and Applications of Optical Communications,* TMH, 2010.
2. S.C.Gupta, *Optical Fiber Communication and its Applications,* PHI, 2005.
3. Satish Kumar, *Fundamentals of Optical Fiber Communications,* PHI, 2009.

IV B.Tech. II Semester

10BT80401: CELLULAR AND MOBILE COMMUNICATIONS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on Communication Systems, Antennas.

COURSE DESCRIPTION:

Introduction to cellular systems; Frequency reuse concepts, desired C/I; Channel interference and reduction techniques; Lee-model for cellular coverage; Antennas for cell sites and mobile units; Frequency management; Handoff techniques; Digital cellular systems.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Demonstrate knowledge in

- Frequency reuse concepts
- Interference types and reduction techniques
- Frequency management and channel assignment
- Handoffs
- Advanced knowledge in Digital cellular systems

CO2. Perform the analysis of analog and digital cellular systems.
CO3. Design low interference cellular systems.
CO4. Solve engineering problems with wide range of solutions in cellular communications.

DETAILED SYLLABUS :

UNIT-I: CELLULAR MOBILE SYSTEMS
Introduction to Cellular Mobile System, Basic Cellular System, Performance Criteria, Uniqueness of Mobile Radio Environment, Hexagonal Shaped Cells, Planning of a Cellular Systems, Analog and Digital Cellular Systems.

UNIT-II: ELEMENTS OF CELLULAR MOBILE RADIO SYSTEM DESIGN
General description of the problem, Concept of Frequency Reuse Channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omnidirectional Antenna System, Cell Splitting, Consideration of the Components of Cellular System.

UNIT-III: INTERFERENCE
Introduction to Co-channel Interference, Real Time Co-channel Interference Measurement, Co-channel Measurement, Design of Antenna System for different Cell Patterns, Antenna Parameters and their effects, Diversity Receiver, types of non-Co-channel Interferences.

UNIT-IV: CELL COVERAGE FOR SIGNAL AND TRAFFIC
Signal Reflections in Flat and Hilly Terrain, Point-to-Point Model (Lee Model)- Effect of Human Made Structures, Phase Difference between Direct and Reflected Paths, Constant Standard Deviation, Straight line path loss slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Foliage loss, Near-in and Long distance propagation, Path loss form a Point to Point Prediction Model.

UNIT-V: CELL SITE AND MOBILE ANTENNAS
Sum and Difference Patterns and their Synthesis, Omnidirectional Antennas, Directional Antennas for Interference Reduction, Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, High Gain Antennas.

UNIT-VI: FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT

Numbering and Grouping, Setup, Access and Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Fixed and non- Fixed Channel Assignments.

UNIT-VII: HANDOFFS AND DROPPED CALLS

Handoff, Types of Handoff-Delaying a Handoff, Forced Handoff, Mobile Assisted Handoff and Soft Handoff, Cell-site Handoff, Intersystem Handoff. Dropped Call Rates and their Evaluation. Cell Splitting and Vehicle Locating Methods.

UNIT-VIII: DIGITAL CELLULAR SYSTEMS

Introduction to 2G Cellular system, GSM architecture, GSM channels, Multiple Access Scheme-TDMA, CDMA. Introduction to 3G Cellular System.

TEXT BOOKS:

1. William C. Y. Lee, *Mobile Cellular Telecommunications,* 2nd Edition, Mc-Graw Hill, 2008.
2. Theodore. S. Rapport, *Wireless Communications,* 2nd Edition, Pearson Education, 2002.

REFERENCE BOOKS:

1. Gordon L. Stuber, *Principles of Mobile Communications,* 2nd Edition, Springer International, 2007.
2. William C. Y. Lee, *Wireless and Mobile Communications,* 3rd Edition, Mc Graw Hills, 2006.
3. Jon W.Mark and Weihua Zhqung, *Wireless Communications and Networking,* Pearson, 2005.
4. R.Blake, *Wireless Communication Technology,* Thompson, Asia Pvt. Ltd., 2004.

IV B.Tech. II Semester

10BT80402: WIRELESS COMMUNICATIONS AND NETWORKS

(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on Digital communications, Computer Networks.

COURSE DESCRIPTION:

Introduction to wireless networking; Wireless data services; MAC and routing protocols in Wireless networks; introduction, architecture, services and protocols of various network standards like Wireless LAN, Bluetooth, Wireless ATM, Hiper LAN, Wi-Fi and WiMAX.

COURSE OUTCOMES: After completion of the course, students should be able to:

CO 1. Demonstrate knowledge in

- Network, Transport and Security protocols of different wireless networks.
- Wireless LAN technology
- Data services of wireless networks ISDN and wireless ATM.
- Architectures of various wireless networks such as WIRELESS ATM, HIPER LAN, Wi-Fi AND WiMAX and Mobile data networks like GSM, GPRS etc.

CO 2. Analyze the protocols for wireless networks.

CO 3. Design and develop new protocols for wireless networks.

CO 4. Solve problems pertaining to the wireless networking.

DETAILED SYLLABUS :

UNIT-I: MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION
Introduction, FDMA, TDMA, Spread Spectrum, Multiple Access, Packet Radio- Packet Radio Protocols, CSMA Protocols, Reservation Protocols, Capture Effect in Packet Radio.

UNIT-II: WIRELESS NETWORKING
Introduction, Difference between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks.

UNIT-III: WIRELESS DATA SERVICES
CDPD, ARDIS, RMD, Common Channel Signaling, ISDN, Broadband ISDN and ATM, SS7, SS7 User Part, Signaling Traffic in SS7.

UNIT-IV: MOBILE IP AND WIRELESS APPLICATION PROTOCOL
Operation of mobile IP, Discovery, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML, WML scripts.
WAP protocol stack: Wireless Application Environment, Wireless session Protocol, Wireless Transaction Protocol, Wireless Transport Layer Security Protocol and Wireless Datagram Protocol.

UNIT-V: WIRELESS LAN TECHNOLOGY
Overview, WLAN Requirements, Infrared LANs, Spread Spectrum LANs, Narrow Band Microwave LANs, IEEE 802 Protocol Architecture, IEEE802.11 Architecture and Services, 802.11 Medium Access Control, 802.11 Physical Layer.

UNIT-VI: BLUETOOTH

Overview, Radio Specification, Base band Specification, Links Manager Specification, Logical Link Control and Adaptation Protocol. Introduction to WLL Technology.

UNIT-VII: MOBILE DATA NETWORKS

Introduction, Data oriented CDPD Network, GPRS and higher Data Rates, Short Messaging Service in GSM, Mobile Application Protocol.

UNIT-VIII: WIRELESS ATM, HIPER LAN, Wi-Fi AND WiMAX

Introduction, Wireless ATM, HIPER LAN - Architecture, Physical Model, Layers and Security. Wi-Fi and Introduction to WiMAX.

TEXT BOOKS:

1. Theodore S. Rappaport, *Wireless Communications,* 2nd Edition, PHI, 2008.
2. William Stallings, *Wireless Communications and Networks,* 2nd Edition, Pearson Education, 2007.
3. Kaveh Pahlavan and Prashant Krishna Murthy, *Principles of Wireless Networks,* PHI, 2005.

REFERENCE BOOKS:

1. Kamilo Feher, *Wireless Digital Communications,* PHI, 2001.
2. Andreaws F. Molisch, *Wideband Wireless Digital Communications,* Pearson Education, 2002.
3. Dharma Prakash Agarwal, Qing-An Zeng, *Introduction to Wireless and Mobile Systems,* 2nd Edition, Thomson, 2006.
4. Gordon L. Stuber, *Principles of Mobile Communications,* 2nd Edition, Springer International, 2007.

IV B.Tech. II Semester

10BT80406: SATELLITE COMMUNICATIONS

(Elective - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on Analog Communications and Digital Communications.

COURSE DESCRIPTION:

Introduction to satellite communications; Orbital Aspects; Satellite Subsystems; Satellite Link Design Overview; Multiple Access-Frequency Assignments; Antennas and Earth Station Technology; Orbit Considerations; Specific Applications of Satellite-Global Positioning System;

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

CO1. Demonstrate knowledge in

- Basic concepts of satellite communications
- Satellite Orbits and Sub-Systems
- Satellite link design
- FDMA,TDMA,CDMA
- Earth station subsystems
- Geostationary satellite systems
- Satellite navigation and global positioning system.

CO2. Perform analysis of complex engineering problems pertaining to satellite systems.
CO3. Design and develop satellite links and communications systems.
CO4. Solve engineering problems with feasible and economical solutions in satellite communications.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION
Origin of Satellite Communications, Historical Background, Basic Concepts of Satellite Communications, Frequency Allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

UNIT-II: ORBITAL MECHANICS AND LAUNCHERS
Orbital Mechanics, Look Angle Determination, Orbital Perturbations, Orbit Determination, Launches and Launch Vehicles, Orbital Effects in Communication Systems Performance.

UNIT-III: SATELLITE SUBSYSTEMS
Satellite Subsystems - Attitude and Orbital Control System, Telemetry, Tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite Antenna, Equipment Reliability and Space Qualification.

UNIT-IV: SATELLITE LINK DESIGN
Basic Transmission Theory, System Noise Temperature and G/T ratio, Design of Down Links, Uplink Design, Design of Satellite Links for specified C/N, System Design example.

UNIT-V: MULTIPLE ACCESS
Frequency Division Multiple Access (FDMA), Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) Frame Structure, examples. Satellite Switched TDMA Onboard Processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.

UNIT-VI: EARTH STATION SUBSYSTEMS
Introduction, Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Primary Power and Test Methods.

UNIT-VII: LOW EARTH ORBIT AND GEOSTATIONARY SATELLITE SYSTEMS
Orbit Consideration, Coverage and Frequency Considerations, Delay and Throughput Considerations, System Considerations, Operational NGSO Constellation Designs.

UNIT-VIII: SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM
Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, Timing Accuracy, GPS Receiver Operation, GPS C/A Code Accuracy, Differential GPS.

TEXT BOOKS:

1. Timothy Pratt, Charles W Bostian and Jeremy E Allnutt, WSE, *Satellite Communications,* 2nd Edition, Wiley publications, 2007.
2. Wilbur L.Pritchard, Henri G.Suyderhoud and Robert A. Nelson, *Satellite Communications Engineering,* 2nd Edition, Pearson Publications, 2008.

REFERENCE BOOKS:

1. M. Richharia, *Satellite Communication Systems Design Principles,* 2nd Edition, Mc Millan Publications, 1999.
2. D.C.Agarwal, *Satellite communications,* 7th Edition, Khanna Publications, 2009.
3. K.N.Raja Rao, *Fundamentals of Satellite communications,* PHI, 2009.
4. Dennis Roddy, *Satellite communications,* 4th Edition, McGraw Hill, 2006.

B.Tech. I Year

14BT1ES02: PROBLEM SOLVING AND COMPUTER PROGRAMMING

(Common to CSE, CSSE and IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	—	6

PREREQUISITE: A course on "Aptitude and Logical Thinking"

COURSE DESCRIPTION: This course deals with the concepts of problem solving, algorithms and program design, elements of 'C' programming language, data types, selection, multi-way selection, repetition, arrays, strings, functions, derived data types, structures, pointers, files and basic data structures of stacks, and queues.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1. Gain knowledge in
- Problem solving Methods and Fundamental Algorithms.
- Elements of C Language
- Selection and Repetition statements.
- Arrays, Strings and Functional statements.
- Derived data types, Files and Pointers.
- Basic data Structures-Stacks and Queues.

CO2. Analyze the problems and develop appropriate algorithms.

CO3. Implement various searching and sorting techniques

CO4. Apply basic data structures such as arrays, stacks and queues in application programs.

CO5. Engage in lifelong learning to develop programming competence.

DETAILED SYLLABUS

UNIT – I: (20 periods)

Introduction to Problem Solving: Algorithm and flowchart, the problem solving aspect, top- down design, implementation of algorithms, program verification and efficiency of algorithms.

Introduction to the C Language: C programs, identifiers, types, variables, types of operators, constants, coding constants, type casting and conversion, formatted input and output. Structure of a C program - expressions, precedence and associativity, evaluation of expressions, mixed type expressions.

UNIT – II: **(22 periods)**

Selection - Making Decisions - Two way selection: if, if-else and nested if-else.

Multi-way selection: else-if ladder and switch statements.

Repetition: concept of loop, pre-test and post-test loops, initialization and updating, event and counter controlled loops, loops in C, break, continue and goto statements.

Fundamental Algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, generation of the Fibonacci sequence, reversing the digits of an integer, number base conversion, character to number conversion, the smallest divisor of an integer, greatest common divisor of two integers and generating prime numbers.

UNIT -III: **(20 periods)**

Arrays: Arrays in C, one, two and multidimensional arrays, linear search, binary search, bubble sort, selection sort and insertion sort.

Strings: Concepts, strings in C, string input/output functions, array of strings and string manipulation functions.

Functions: Designing structured programs, functions in C, user-defined functions, types of functions, Recursion and factorial using recursion, standard library functions, scope, storage classes and pre-processor directives

UNIT – IV: **(20 periods)**

Derived Types: Type definition (typedef), enumerated types, structure, accessing structures.

Complex Structures: Nested structures, structures containing arrays, array of structures.

Structures and Functions: Sending individual members, sending the whole structure, unions and bit fields.

Pointers: Concepts, pointer variables, accessing variables through pointers, pointer declaration and definition, initialization, pointer arithmetic, array of pointers, pointers to arrays, pointers and functions, call-by-value and call-by-reference, pointers to pointers, pointers to structures and memory allocation functions.

UNIT – V: **(18 periods)**

Files: Introduction and classification of files, opening and closing of files, read and write operations, conversion of files and command line arguments.

Basic Data Structures: Overview of data structures, implementation of stack operations (push, pop), implementation of linear and Circular queue operations (insertion, deletion) using arrays.

(Total periods: 100)

TEXT BOOKS:

1. Behrouz A. Forouzan and Richard F. Gilberg, "A Structured Programming Approach using C," Third Edition, Cengage Learning, NewDelhi, 2007.
2. R.G. Dromey, "How to Solve it by Computer," First Edition, Pearson Education, NewDelhi, 1982.

REFERENCE BOOKS:

1. Pradip Dey and Manas Ghosh, "Programming in C," Second Edition, Oxford University Press, NewDelhi, 2007.
2. Jeri R Hanly and Elliot B. Koffman, "Problem Solving and Program design in C," Seventh Edition, Pearson Education, NewDelhi, 2014.

II B.Tech. -I Semester

14BT30501: DATA STRUCTURES

(Common to CSE, CSSE&IT)

Int. Marks: 30   Ext. Marks: 70   Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Concepts of Data Structures- Linked Lists, Stacks, Queues, Trees Graphs, Sorting, and Hashing.

COURSE OUTCOMES:

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

CO1. Gain Knowledge in

- Principles of Data Structures.
- Abstract Data Type.
- Linear and Non-linear Data Structures.

CO2. Analyze and Identify suitable data structure design techniques for problem solving.

CO3. Develop programs to implement linear and non liner data structures.

<u>Detailed Syllabus:</u>

UNIT-I: LINKED LISTS (9 periods)

LINKED LISTS: Introduction To Data Structures, Pointers, Basic Operations, Implementation, Application, Circular Linked Lists, Doubly Linked List.

UNIT-II: STACKS AND QUEUES (8 periods)

STACKS: Basic Stack Operations, Stack Linked List, Implementation, and Stack Applications.

QUEUES: Queue Operations, Queue Linked List Design, Queue Applications

UNIT-III: TREES, SEARCH TREES, AND HEAPS (10 periods)

TREES: Basic Tree Concepts, Binary Trees.

BINARY SEARCH TREES (BST): Basic Concepts, BST Operations, BST Applications.
AVL SEARCH TREES: Basic Concepts, AVL Tree Implementations.
HEAPS: Basic Concepts, Heap Implementation, Heap Application.

UNIT-IV: MULTIWAY TREES AND GRAPHS

(9 periods)

MULTIWAY TREES: B-Trees, Simplified B-Trees, B-Tree Variations.
GRAPHS: Basic Concepts, Operations, Graph Storage Structures, Graph Algorithms: Create Graph, Insert Vertex, Delete Vertex, Retrieve Vertex, Depth-first Traversal, Breadth-first Traversal.

UNIT-V: SORTING AND HASHING

(9 periods)

SORTING: Sorting by Exchange-Shell Sort, Quick sort. Sorting By Distribution-Counting Sort, Bucket Sort, Radix Sort. Sorting By Merging-Merge Sort
HASHING: Introduction, Hash Table Structure, Hash Functions, Linear Open Addressing, Chaining, Applications.

(Total: 45 periods)

TEXT BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, "Data Structures: A Pseudo code Approach with C", Second Edition, 2007.
2. Debasis Samanta, "Classic Data Structures", PHI Learning, Second Edition, 2009.

REFERENCE BOOKS:

1. G.A.V. Pai, "Data Structures and Algorithms", Tata McGraw Hill, Second Edition, 2009.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J.Augenstein, "Data Structures Using C", Pearson Education, 2005.

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SVEC-10 Regulations

III B. Tech I-Semester
(10BT50501) DESIGN AND ANALYSIS OF ALGORITHMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: A Course on DATA STUCTURES AND C PROGRAMMING

COURSE DESCRIPTION: Introduction to algorithms and notations; Disjoint sets and graphs; Divide and conquer; Greedy method; Dynamic programming; Backtracking; Branch and bound; and NP-hard and NP-complete problems

Course Objectives:

- To introduce basic foundation in design, analysis and application of various algorithms.
- To develop skills in writing various algorithms for real time problem solving.
- To apply various algorithms for overcoming time and space complexities for optimized solutions.

Course Outcomes:

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

1. Gain knowledge on:
   i) asymptotic notation for space and time complexity
   ii) Methods such as graphs, divide and conquer, greedy, dynamic programming, back tracking and branch and bound.
   iii) Types of problems with respect to non polynomial types.
2. Analytical ability to measure performance of various algorithms.
3. Design skills for developing algorithms for various problems.
4. Gain ability to solve problems to model, analyze, identified method, design and evaluate performance.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION

Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big (o) notation, Omega notation, Theta notation and Little (o) notation, Recurrences, Probabilistic analysis.

UNIT II: DISJOINT SETS AND GRAPHS (Algorithm and Analysis)

Disjoint set operations, union and find algorithms, Graphs-Breadth First search and Traversal, Depth First Search and Traversal, spanning trees, connected components and biconnected components.

UNIT III: DIVIDE AND CONQUER
General method, Applications-Analysis of Binary search, Quick sort, Merge sort, Strassen's matrix multiplication, Finding the Maxima and Minima.

UNIT IV : GREEDY METHOD

General method, Applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem, Optimal storage on Tapes.

UNIT V: DYNAMIC PROGRAMMING

General method, Applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design, String Editing.

UNIT VI: BACKTRACKING

General method, applications-n-queen problem, sum of subsets problem, graph colouring, 0/1 knapsack problem, Hamiltonian cycles.

UNIT VII: BRANCH AND BOUND

General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT VIII: NP-HARD AND NP-COMPLETE PROBLEMS

Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem, NP-hard scheduling Problems.

TEXT BOOK:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, *Fundamentals of Computer Algorithms*, 2 ed, Galgotia publications Pvt. Ltd.

REFERENCE BOOKS:

1. M.T.Goodrich and R. Tomassia, *Algorithm Design: Foundations, Analysis and Internet examples*, John Wiley and sons, 2002.
2. R.C.T.Lee, S.S. Tseng, R.C. Chang and T. Tsai, *Introduction to Design and Analysis of Algorithms A strategic approach*, McGraw Hill, 2006.
3. Allen Weiss, *Data structures and Algorithm Analysis in C++*, 2 ed, Pearson education.
4. Aho, Ullman and Hopcroft, *Design and Analysis of algorithms*, 2 ed, Pearson education.

III B. Tech I-Semester

(10BT50502) MICROPROCESSORS AND INTERFACING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: A courses on "Digital Logic Design"

COURSE DESCRIPTION: Introduction to Microprocessors; Assembly Language Programming; Architecture of 8086 and Interfacing; Programmable Interfacing Devices; Interrupts and Programmable Interrupt Controllers; Serial Data Transfer Schemes; Advanced Microprocessors; 8051 Microcontroller and its programming.

Course Objectives:

- To impart knowledge on architectures of microprocessors and microcontrollers.
- To develop programming skills for microprocessors and microcontrollers.
- To design applications using microprocessors and microcontrollers.

Course Outcomes:

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

1. Learn architecture of microprocessors -8085, 8086 , microcontroller 8051 and advanced microprocessors.
2. Develop working knowledge and skills to interface devices such as 8255, 8257, and 8259 and develop real time applications using microprocessors.
3. Apply programming skills in assembly language and develop programs using microprocessors and microcontrollers.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION

An overview of 8085, Architecture of 8086 microprocessor. Register organization. 8086 flag register and functions of 8086 flags. Addressing modes of 8086, Instruction set of 8086.

Assembler directives. Simple programs - Procedures and Macros.

UNIT-II: ASSEMBLY LANGUAGE PROGRAMMING

Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-III: ARCHITECTURE OF 8086 & INTERFACING

Pin configuration of 8086-Minimum mode and maximum mode of operation, Timing diagram. Memory interfacing to 8086 (static RAM and EPROM), Need of Direct Memory Access (DMA), DMA data transfer method, Interfacing with 8237/8257.

UNIT-IV: PROGRAMMABLE INTERFACING DEVICES

8255 PPI-various modes of operation and interfacing to 8086, Interfacing keyboard, displays, 8279, stepper motor and actuators, D/A and A/D converter interfacing.

UNIT-V: INTERRUPTS AND PROGRAMMABLE INTERRUPT CONTROLLERS

Interrupt structure of 8086, Interrupt Vector table. Interrupt service routines, Introduction to DOS and BIOS interrupts, 8259 PIC architecture and interfacing cascading of interrupt controller and its importance, Programming with 8259.

UNIT-VI: SERIAL DATA TRANSFER SCHEMES

Asynchronous and synchronous data transfer schemes, 8251 USART architecture and interfacing, TTL to RS232C and RS232C to TTL conversion, Sample programs for serial data transfer.

Introduction to high-speed serial communications standards, USB.

UNIT-VII: ADVANCED MICROPROCESSORS

Introduction to 80286, Salient Features of 80386, Real and Protected Mode, Segmentation and Paging, Salient Features of Pentium, Branch Prediction, Overview of RISC Processors.

UNIT-VIII: 8051 MICROCONTROLLER AND ITS PROGRAMMING

Architecture of microcontroller - 8051 Microcontroller - internal and external memories-counters and timers - synchronous serial communication - asynchronous serial communication-interrupts.

Addressing modes of 8051, Instruction set of 8051, Assembly Language Programming examples using 8051.

TEXT BOOKS:

1. A.K. Ray and K.M.Bhurchandi, *Advanced microprocessor and peripherals*, 2 ed, Tata Mc-Graw Hill Edition, 2000.
2. Kenneth J. Ayala, *The 8051 Microcontroller architecture, programming & applications*, 2 ed, Pearson.

REFERENCE BOOKS:

1. Douglas V.Hall, *Microprocessors Interfacing*, 2 ed, 2007, TMH.
2. Walter A. Triebel, Avtar Singh, *The 8088 and 8086 Microprocessors*, 4 ed, PHI, 2003.
3. Liu and GA Gibson, *Micro computer system 8066/8088 family Architecture*, *programming and Design*, 2 ed, PHI.
4. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, PHI, 2000.
5. Deshmukh, *Microcontrollers*, Tata McGraw Hill Edition, 2004.

SVEC-10 Regulations

III B. Tech I-Semester
(10BT50503) DATABASE MANAGEMENT SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: A Course on "Data Structures"

COURSE DESCRIPTION: Introduction to Database Systems; Database Design; Relational Model; SQL Queries, Constraints and Triggers; Schema Refinement and Normal Forms; Transaction Management; Concurrency Control and Recovery System; Overview of Storage and Indexing.

Course Objectives:

- To impart knowledge on database management systems.
- To develop skills on SQL for database creation and maintenance.
- To gain advanced knowledge for database design and integrity.
- To apply concepts of SQL and database design to develop DBMS applications.

Course Outcomes:

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

1. Gain knowledge on:
   - Fundamentals of DBMS
   - Database design
   - Normal forms
   - Storage and Indexing
2. Apply Structured Query Language (SQL) and PL-SQL in retrieval and management of data in real time applications.
3. Develop skills in designing, managing databases and its security.

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DETAILED SYLLABUS:

UNIT I: INTRODUCTION

History of Database Systems, Introduction to DBMS, Database System Applications, Database Systems Versus File Systems, View of Data, Data Models, Database Languages- DDL & DML Commands and Examples of Basic SQL Queries, Database Users and Administrators, Transaction Management, Database System Structure, Application Architectures.

UNIT II: DATABASE DESIGN

Introduction to Database Design and E-R Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the E-R Model, Conceptual Design with the E-R Model, Conceptual Design for Large Enterprises.

UNIT III: THE RELATIONAL MODEL

Introduction to the Relational Model, Integrity Constraints over relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/Altering Tables and Views.

Relational Algebra and Calculus: Preliminaries, Relational Algebra Operators, Relational Calculus – Tuple and Domain Relational Calculus, Expressive Power of Algebra and Calculus.

UNIT IV: SQL: QUERIES, CONSTRAINTS, TRIGGERS

Overview, The form of a Basic SQL Query, Union, Intersect and Except operators, Nested Queries, Aggregate Operators, Null values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Designing Active Databases.(Chapter 5;Sections 5.1-5.9 including subtopics from Text book-1)

UNIT V: SCHEMA REFINEMENT AND NORMAL FORMS

Introduction to Schema Refinement, Functional Dependencies, Reasoning about FDs, Normal Forms – 1NF, 2NF, 3NF, BCNF, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies – 4NF, 5NF, DKNF, Case Studies.

UNIT VI: TRANSACTIONS MANAGEMENT

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Transaction Definition in SQL, Testing for Serializability.

UNIT VII: CONCURRENCY CONTROL AND RECOVERY SYSTEM.

Concurrency Control: Lock Based protocols, Time-Stamp Based Protocols, Validation based Protocols, Multiple Granularity, and Deadlock Handling.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Non-volatile Storage, Advanced Recovery Techniques, Remote Backup Systems.

UNIT VIII: OVERVIEW OF STORAGE AND INDEXING

Data on External Storage, File Organizations and Indexing, Index Data Structures, Comparison of File Organizations, Indexes and Performance Tuning.

Tree-Structured Indexing: Intuition for Tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Tree Structure.

TEXT BOOK:

1. Raghurama Krishnan, Johannes Gehrke, *Database Management Systems*, 3 ed, Tata McGrawHill, 2007.
2. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, *Database System Concepts,* 5 ed, McGraw-Hill, 2005.

REFERENCE BOOKS:

1. Elmasri Navate, *Fundamentals of Database Systems*, Pearson Education,1994.
2. Peter Rob and Carlos Coronel, *Database Systems Design, Implementation and Management*, 7 ed, 2009.
3. Pranab Kumar Das Gupta, *Database Management System Oracle SQL and PL/SQL*, PHI Learning Private Limited, 2009.

SVEC-10 Regulations

III B. Tech I-Semester
(10BT50504) OPERATING SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	--	--	4

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Operating Systems Overview; Process management; Concurrency and Synchronization; Deadlocks; Memory Management; File System; I/ O System; Protection and Security.

Course Objectives:

- To impart knowledge on fundamentals and principles of modern operating systems.
- To analyze various CPU scheduling algorithms, multithreading, Memory management Techniques.
- To provide skills for handling process synchronization issues.
- To apply banker's algorithm for deadlock problem.
- To imbibe attitude of critical thinking and independent problem solving.

Course Outcomes:

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

1. Gain knowledge on: Operating system functions and services, file system, memory management, security and protection.
2. Analyses skills on
   - CPU scheduling algorithms – FCFS, SJF, Priority and Round Robin
   - Disk Scheduling algorithms – FCFS, SSTF, Scan, CScan, Look, Clock
   - Memory Allocation algorithms – MFT, MVT
   - Page replacement algorithms – FIFO, Optimal, LFU, LRU
   - File and Directory maintenance.
3. Apply appropriate process synchronization techniques to real time problems.

DETAILED SYLLABUS:

UNIT I: OPERATING SYSTEMS OVERVIEW

Introduction, Operating system operations, Process management, Memory management, Storage management, Protection and Security, Distributed Systems, Special purpose systems.

Operating systems structures: Operating system services and Systems calls, System programs, Operating system structure, Operating systems generations.

UNIT II: PROCESS MANAGEMENT

Process concepts, Process state, Process control block, Scheduling queues, Process scheduling, Multithreaded programming, threads in UNIX, Comparison of UNIX and Windows.

UNIT III: CONCURRENCY AND SYNCHRONIZATION

Process synchronization, Critical-section problem, Peterson's Solution, Synchronization Hardware, semaphores, Classic problems of synchronization, Readers and Writers problem, Dining-philosophers problem, Monitors, Synchronization examples(Solaris), atomic transactions. Comparison of UNIX and Windows.

UNIT IV: DEADLOCKS

System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock- bankers algorithm.

UNIT V: MEMORY MANAGEMENT

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, Allocation of frames, Thrashing, case study- UNIX.

UNIT VI: FILE SYSTEM

Concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection.
File System implementation: File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, comparison of UNIX and Windows.

UNIT VII: I/O SYSTEM

Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling algorithms, swap-space management, stable-storage implementation, Tertiary storage structure.

I/O: Hardware, application I/O interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

UNIT VIII: PROTECTION AND SECURITY

Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights. Security: The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, fire walling to protect systems.

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Principles*, 7 ed, John Wiley.

REFERENCE BOOKS:

1. Stallings, *Operating Systems, Internals and Design Principles*, 5 ed, Pearson Education, 2006.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2 ed, PHI, 2007.
3. Deitel & Deitel, *Operating systems*, 3 ed, Pearson Education, 2008.
4. Crowley, *Operating systems Oriented Approach*, TMH, 1998.
5. Dhamdhere, *Operating systems*, Second Edition, TMH, 2008.

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III B. Tech II-Semester

(10BT60501) THEORY OF COMPUTATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: Courses on 'Discrete Mathematical Structures', 'Digital Logic Design' and 'Data Structures'.

Course Description: Introduction to Theory of Automata, Finite Automata, Regular Expressions, Formal Languages, Context Free Languages, Pushdown Automata, Turing Machines and Linear Bounded Automata and Computability Theory.

Course Objectives:

- To impart knowledge on String Finite Automata, Turing Machine Model and LR Grammar.
- To develop analysis and design skills for the construction of Turing machines for a given task.
- To apply regular expressions, languages, and grammars for designing a finite automata.

Course Outcomes:

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

1. Gain knowledge on –Deterministic and Non Deterministic Finite Automata, types of Turing machines and their languages, and LR Grammar.
2. Demonstrate analytical and design skills in constructing Linear bounded automata for the given specifications.
3. Design and develop Parsers using Pushdown Automata, and Context Free Languages.
4. Gain problem solving skills in Computability theory and Counter machines to solve real time problems.

DETAILED SYLLABUS:

UNIT–I: INTRODUCTION TO THEORY OF AUTOMATA

Strings, Alphabets, Language, Operations on sets, Definition of an automaton, Description of a Finite Automaton (FA), Transition systems, Properties of transition functions, Acceptability of a string by a finite automaton.

UNIT-II: FINITE AUTOMATA

Deterministic finite automata(DFA), Nondeterministic finite automata(NFA), The language of a DFA, The Language of an NFA,

NFA to DFA conversion, Equivalence between two finite state machines, Finite automata with output-Mealy and Moore machines, Minimization of finite automata.

UNIT-III: REGULAR EXPRESSIONS

Regular expressions, Regular sets, Identity rules, Constructing finite automata for a given regular expressions, Conversion of finite automata to regular expressions, Pumping lemma for regular sets, Applications of pumping lemma, Closure properties of regular sets.

UNIT-IV: FORMAL LANGUAGES

Basic definitions and examples, Chomsky classification of languages, Languages and their relation, Languages and automata, Regular grammars- Right linear and Left linear grammars, Equivalence between regular linear grammar and FA.

Context Free Grammars: Definition of context free grammars(CFG), Leftmost and rightmost derivations, The language of a grammar, Sentential forms, Constructing parse trees, The yield of a parse tree, Ambiguous grammars, Removing ambiguity from grammars.

UNIT-V: CONTEXT FREE LANGUAGES

Simplification of CFG, Eliminating useless symbols, Elimination of NULL productions, Elimination of unit productions, Chomsky Normal Form (CNF), Greibach Normal Form(GNF), Pumping lemma for context free languages(CFL).

UNIT-VI: PUSHDOWN AUTOMATA

Definition of pushdown automaton(PDA), The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic pushdown automaton.

UNIT-VII: TURING MACHINES AND LINEAR BOUNDED AUTOMATA

Turing Machine model, Representation of Turing Machines(TM), Languages acceptability by Turing Machines, Design of Turing Machines, Computable functions, Recursively enumerable languages, Church's hypothesis, Counter machine, Types of Turing Machines, The model of linear bounded automaton(LBA), Turing Machines and type 0 grammar, Linear bounded automata and Languages.

UNIT-VIII: COMPUTABILITY THEORY

LR(k) grammar, Universal Turing Machines, Undecidable problems about Turing Machines, Post's Correspondence Problem, The Classes P and NP, An NP-Complete and NP-Hard Problems.

TEXT BOOK:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, *Introduction to Automata Theory Languages and Computation,* 2nd edition, Pearson Education, 2005.

REFERENCE BOOKS:

1. K.L.P Mishra and N. Chandrashekaran, *Theory of Computer Science-Automata Languages and Computation,* 2nd edition, PHI, 2003.

2. John C Martin, *Introduction to Languages and the Theory of Computation,* 3rd edition, Tata McGraw Hill, 2003.

3. Daniel I.A. Cohen, *Introduction to Computer Theory,* 2nd edition, John Wiley, 2007

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III B. Tech II-Semester
(10BT60502) UNIX PROGRAMMING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	--	4

PREQUISITES: A Course on Operating Systems

COURSE DESCRIPTION: Introduction to Unix and Unix Utilities; Text Processing and Backup Utilities; Working with the Bourne again Shell (Bash); Unix File Structure; Process and Signals; Data Management and File Locking; Inter-Process Communication and Introduction to Sockets

Course Objectives:

- To impart knowledge on UNIX commands, file structure utilities, processes, data management, IPC, sockets.
- To implement applications in UNIX using various system calls.
- To provide skills on shell programming, socket programming and inter process communication.

Course Outcomes:

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

1. Gain Knowledge on UNIX commands, processes, signals, sockets and IPC.
2. Apply various system calls to interact with UNIX environment.
3. Implement UNIX applications using shell and socket programming.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO UNIX AND UNIX UTILITIES

A Brief history of Unix, Architecture of Unix, Features of Unix, Introduction to vi editor. General Purpose Utilities, File Handling Utilities, Security by File Permissions, Process Utilities, Disk Utilities, Networking Commands, detailed commands to be covered are passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, w, finger, arp, ftp, telnet, rlogin.

UNIT-II: TEXT PROCESSING AND BACKUP UTILITIES

Text Processing Utilities and Backup Utilities , detailed commands to be covered are cat, tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.

UNIT-III: WORKING WITH THE BOURNE AGAIN SHELL (BASH)

Shell, Shell Responsibilities, Types of Shell, Pipes and I/O Redirection, Shell as a Programming Language, Shell Syntax: Variables, Conditions, Control Structures, Commands, Command Execution, Here Documents, and Debugging Scripts.

UNIT-IV: UNIX FILE STRUCTURE

Introduction to Unix File System, Inode (Index Node), File Descriptors, System Calls and Device Drivers, Library Functions.

Low Level File Access: open, read, write, close, lseek, stat, fstat, lstat, ioctl, umask, dup and dup2.

The Standard I/O Library: fopen, fread, fwrite, fclose, fflush, fseek, fgetc, fputc, fgets.

Formatted Input and Output: printf, fprintf, sprint, scanf, fscanf, and sscanf.

File and Directory Maintenance: chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd, Scanning Directories: opendir, readdir, telldir, seekdir, closedir.

UNIT-V: PROCESS AND SIGNALS

Process, Process Identifiers, Process Structure: Process Table, Viewing Processes, System Processes, Process Scheduling, Starting New Processes: Waiting for a Process, Zombie Processes, fork, vfork, exit, wait, waitpid, exec, Signals functions, Unreliable Signals, Interrupted System Calls, kill, raise, alarm, pause, abort, system, sleep Functions, Signal Sets.

UNIT-VI: DATA MANAGEMENT AND FILE LOCKING

Data Management: Managing Memory: malloc, free, realloc, calloc, File Locking: Creating Lock Files, Locking Regions, Use of Read and Write with Locking, Competing Locks, Other Lock Commands-Advisory Locking,Mandatory Locking;Deadlocks.

UNIT- VII: INTER-PROCESS COMMUNICATION

Pipe, Process Pipes, The Pipe Call, Parent and Child Processes, Named Pipes: FIFOs, Semaphores: semget, semop, semctl, Message Queues: msgget, msgsnd, msgrcv, msgctl, Shared Memory: shmget, shmat, shmdt, shmctl, IPC Status Commands.

UNIT-VIII: INTRODUCTION TO SOCKETS

Socket, Socket Connections - Socket Attributes, Socket Addresses, socket, connect, bind, listen, accept, Socket Communications.

TEXT BOOK:

1. W. Richard. Stevens, *Advanced Programming in the UNIX Environment*, 1 ed, Pearson Education, 2005.

REFERENCE BOOKS:

1. Sumitabha Das, *Your Unix The Ultimate Guide*, TMH, 2007.
2. Neil Matthew, *Richard Stones, Beginning Linux Programming*, 3 ed, Wiley Dreamtech India (P) Ltd.
3. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, *UNIX Network Programming - The Sockets Networking API*, 3 ed, Volume 1, PHI Learning Private Limited.

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III B. Tech II-Semester

(10BT60503) DATA WAREHOUSING AND DATA MINING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: A Course on Database Management Systems

COURSE DESCRIPTION: Introduction to data warehouse system, architecture and schemas; Data mining fundamentals, functionalities and major issues; Data pre-processing techniques; Association rule mining, Classification and prediction; Clustering techniques; Mining stream, spatial, text and web data.

Course Objectives:

- To provide knowledge on Data warehouse fundamentals and data mining functionalities.
- To develop skills on data warehouse schema design and data pre-processing techniques.
- To apply knowledge and skills of data mining functionalities to find hidden patterns from large databases.
- To imbibe creative thinking to get knowledge from text, multimedia and web databases.

Course Outcomes:

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

1. Gain knowledge in data mining and data warehousing.
2. Analyze data using association, classification and clustering techniques.
3. Design classification, Cluster Analysis techniques for mining of spatial, multimedia, text and web data.
4. Acquire skills in pre-processing of data for data mining.
5. Apply the data mining tools for decision making and knowledge discovery for commercial and technical applications.

DETAILED SYLLABUS:

UNIT-I: DATA WAREHOUSE AND OLAP TECHNOLOGY

Data Warehouses – Definitions – Multidimensional Data Model – Data Warehouse Architecture.(Chapter 3;Sections 3.1-3.3 including sub topics of the Text book)

UNIT-II: INTRODUCTION TO DATA MINING

Definition of Data Mining – Kinds of Data – Data Mining Functionalities– Classification of Data Mining Systems – Primitives – Major Issues in Data Mining.

UNIT-III: DATA PREPROCESSING

Descriptive Data Summarization- Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT-IV: MINING FREQUENT PATTERNS AND ASSOCIATIONS

Basic Concepts – Efficient and Scalable Frequent Itemset Mining Methods – Association Rule Mining.(Chapter 5;Sections 5.1-5.5 including subtopics of Text book)

UNIT-V: CLASSIFICATION

Decision Tree Induction, Bayesian Classification – Rule Based Classification, Prediction – Accuracy and Error Measures.

UNIT-VI: CLUSTER ANALYSIS

Cluster Analysis – Categories of Clustering Methods – Partitioning Methods – Hierarchical Methods – Density based Methods – Grid based methods – Model Based Clustering methods – Clustering High Dimensional Data – CLIQUE.

UNIT-VII: MINING STREAM, TIME SERIES AND SEQUENCE DATA

Mining data streams, Mining Time Series Data, Mining Sequence Patterns in Biological Data.

UNIT-VIII: MINING OBJECT, SPATIAL, MULTIMEDIA, TEXT AND WEB

Multi Dimensional Analysis on Complex Object data types – Descriptive Mining on Complex Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Web Mining.

TEXT BOOK:

1. Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques*, 2 ed, Elsevier, 2008.

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*, 2 ed, Pearson Education, 2006.
2. Amitesh Sinha, *Data Warehousing*, Thomson Learning, 2007
3. Xingdong Wu, Vipin Kumar, *The Top Ten Algorithms in Data Mining*, Taylor and Francis Group, 2009.
4. Max Barmer, *Principles of Data Mining*, Springer, 2007

III B.Tech. II Semester

10BT60504: DISTRIBUTED COMPUTING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES:A Course On Computer Networks, Operating System.

COURSE DESCRIPTION: Introduction to Distributed Computing, Interprocess Communication, Distributed Computing Paradigms, Socket API, Group Communication, Remote Method Invocation (RMI), Data Privacy & Security Concerns and Advanced Distributed Computing Paradigms.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain advanced knowledge in
   - IPC mechanisms and Event Synchronization
   - Distributed Computing Paradigms
   - SOCKET API
   - Group Communication
   - Distributed Objects
   - Remote Method Invocation (RMI) and Internet Applications
2. Analyze message passing, client- server and peer -to-peer models to understand distributed computing paradigms.
3. Design and Implement application programs on distributed computing systems.
4. Apply appropriate techniques and tools to design distributed computing systems and deploying in Internet applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION

Forms of computing-Strengths and weaknesses of distributed computing-OS overview-Network overview-Software Eng. overview.

UNIT-II: INTERPROCESS COMMUNICATION

IPC program interface-Event synchronization-Timeouts and threading- Deadlock and timeouts-Data representation- Data encoding-Text based protocols-Request response protocols-Event and sequence diagram-Connection vs connectionless IPC.

UNIT-III: DISTRIBUTED COMPUTING PARADIGMS

Message passing, client server, peer to peer, message system, remote procedure, call model, distributed objects, object space, mobile agent, network services, collaborative application - Abstraction, Tradeoffs: abstraction vs overhead, scalability, cross-platform.

UNIT-IV: SOCKET API

Socket metaphor, diagram socket API stream mode socket API, sockets with non-blocking I/O, secure socket API, Client server paradigm, Issues, service session, protocol for a service, Inter-process communications & event synchronization, data representation, Software engineering for a network service, software architecture, IPS Mechanism, Daytime client server, Connection oriented and connectionless servers, Echo client server, Iterative server and concurrent server, Stateful servers - global state information, session state information.

UNIT-V: GROUP COMMUNICATION

Unicasting, Multicasting, Multicast API, Connection oriented and connectionless Reliable, Unreliable multicast, Java Basic Multicast API-IP Multicast addresses, Joining/sending multicast group.

Distributed Objects-message passing vs distributed object, distributed object architecture, distributed object systems, remote procedure calls, Java RMI architecture, client side, server side, object registry, API for Java RMI, Remote interface, server side software, client side software, RMI vs socket API.

UNIT-VI: REMOTE METHOD INVOCATION (RMI)

Client callback, Client side, Server side, Stub downloading, RMI Security manager Instantiation of a Security manager, Java security policy file, Specifying stub downloading and a security policy file, Algorithms for building RMI application, Allowing for Stub downloading.

Internet applications-HTML, XML, HTTP, Client request, Server response Content type and MIME,HTTP: connection oriented, stateless protocol, Dynamically generated web contents, Common gateway interface, Web form, Query string processing Encoding and decoding query strings, Environment variables in CGI, Web session and session state data, hidden form feeds for transferring session state data, cookies for transferring session state data, HTTP header lines.

UNIT-VII: DATA PRIVACY AND SECURITY CONCERNS

Internet Applications - Applets, Servlets, Architectural Support, Servlet programming, State information maintenance, Web services, Simple Object Access Protocol, SOAP request, SOAP response, Apache SOAP, Invoking web service, Implementing web service.

UNIT-VIII: ADVANCED DISTRIBUTED COMPUTING PARADIGMS:

Message Queue system paradigm - Point to point, Publish/ Subscribe, Mobile Agents - Basic architecture, Advantages, Mobile agent framework systems, Network services, Object spaces.

TEXT BOOK:

1. M. L. Liu, *Distributed Computing: Principles and Applications*, Pearson/Addison-Wesley, 2004.

REFERENCE BOOKS:

1. A. Taunenbaum, *Distributed Systems: Principles and Paradigms*, Pearson, 2005.
2. G. Coulouris, J. Dollimore and T. Kindberg, *Distributed Systems: Concepts and Design*, 2 ed, Pearson Education.
3. Hagit Attiya, Jennifer Welch, *Distributed Computing: Fundamentals, Simulations, and Advanced Topics,* 2 ed, Wiley Series on Parallel and Distributed Computing.

III B. Tech I-Semester

(10BT4HS02) ADVANCED ENGLISH COMMUNICATION SKILLS (AUDIT COURSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	3	-	-

PREREQUISITE: Basic Grammar and Fundamentals of Writing Skills

COURSE DESCRIPTION:

Vocabulary Building; Reading Comprehension; Academic Essay; Technical Report; Career Skills; Resume Writing; Group Discussion; Interview Skills.

COURSE OBJECTIVES:

1. To enrich vocabulary in order to meet global competitions and ability to use critical terminology appropriately
2. To impart practical knowledge in writing academic and technical reports.
3. To bring awareness on the power of language: to go beyond the surface level of words and to discover hidden or intended meaning for effective usage of language.
4. To apply the nuances of English language for various communication needs and presentations with emphasis on LSRW skills.
5. To imbibe the language skills for adaptability

COURSE OUTCOMES:

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

1. Acquire knowledge in.
    a. Vocabulary
    b. Etymology
    c. Idioms and Phrases
2. Analyse the functional knowledge of writing, styles and techniques for academic and professional requirements.
3. Interpret and synthesize the language functions through:
    a. Role Plays
    b. Group Discussions
    c. Mock Interviews
4. Use and create techniques and language lab software for enhancing the language skills.
5. Communicate effectively with engineering community and society in formal and informal situations.
6. Inculcate attitude to upgrade communicative competence for meeting global challenges.

UNIT I: VOCABULARY BUILDING:

Synonyms and Antonyms, Word roots, One-word substitutes, Prefixes and Suffixes, Study of word origin, Analogy, Idioms and Phrases.

Functional English: starting conversation, responding appropriately and relevantly, using the right body language, role play in different situations.

UNIT II: READING COMPREHENSION

Reading for facts, Guessing meanings from context, Scanning, Skimming, Inferring meaning and Critical reading.

UNIT III: ACADEMIC ESSAY WRITING

Accuracy, Brevity, Clarity, Brainstorm, List your ideas, Sub-headings, Revising Content and Organisation.

Unit IV: TECHNICAL REPORT WRITING

Types of formats and styles, Subject-matter, Subject-organization, Clarity, Coherence and Style, Planning, Data-collection, Tools, Analysis.

Unit V: CAREER SKILLS

Career direction, Exploring your talents, Personality inventories, Write a "Who I Am" statement, Thinking further, Perform career research, How do I get hired, Creating job satisfaction, Identify your satisfaction triggers, Positive attitude, Maintain a balanced lifestyle, Analyze your job in terms of your interests, Set goals to bring your interests and responsibilities in line, Personal SWOT analysis, Making the most of your talents and opportunities, Shaping your job to fit you better, Future proof your career, Managing your emotions at work, Get the recognition you deserve.

UNIT VI: RESUME WRITING

Structure and Presentation, Planning, Defining the career objective, Projecting ones strengths and skill-sets, Summary, Formats and Styles, Cover letter.

UNIT VII : GROUP DISCUSSION

Dynamics of group discussion, Intervention, Summarizing, Modulation of voice, Fluency and Coherence, Participation, Relevance, Assertiveness, Eye contact and Body language.

Unit VIII: INTERVIEW SKILLS

Concept and Process, Pre-interview planning, Opening strategies, Answering strategies, Interview through Tele and Video-conferencing.

REFERENCE BOOKS:

1. M. Ashraf Rizvi, "Effective Technical Communication Skills", Tata McGraw Hill, New Delhi, 2005.

2. Meenakshi Raman and Sangetha Sharma, "Technical Communi cation, Principles and Practice", Oxford University Press, New Delhi, 2010.

3. Santha Kumar R, "Secrets of Success in Interviews", Crucial Books, Secunderabad, 2007.

4. M. Ashraf Rizvi, "Resumes and Interviews - The Art of Wining",Tata Mc Graw Hill, New Delhi, 2008.

5. Gopala Swamy Ramesh and Mahadevan Ramesh, "The Ace of Soft Skills: Attitude, Communication and Etiquette for Success", Pearson Education, New Delhi, 2009.

SUGGESTED SOFTWARE:

1. TOEFL, GRE and IELTS (Kaplan, Aarco and Barrons, Cliffs)
2. Softwares from 'train2success.com'
3. Resume Preparation, K-Van Solutions.
4. Facing Interviews, K-Van Solutions.
5. Study Skills Success, (Essay, Vocabulary strategies, IELTS), Young India Films.
6. Vocabulary Builder, Young India Films.
7. E-correspondence, Young India Films.
8. Group Discussions, (Ease - 2), Young India Films.
9. Report Writer, Young India Films.

IV B. Tech II-Semester
(10BT6HS01) MANAGEMENT SCIENCE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	--	4

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Management science approaches in organizations, including modeling and rational approaches to decision-making process; Historic development of management thought: decision making; the management functions of planning, organizing, leading and controlling. Case analysis; materials management; business simulations and real-time projects; analysis and communication, using real world applications and cases; decision analysis as applied to tactical and strategic business decisions.

COURSE OBJECTIVES:

- To impart fundamental knowledge to analyze cost/revenue data and carry out economic analyses in the decision making process.
- To provide a comprehensive and concise introduction to the key techniques and problem structuring methods used within Management Science that are directly relevant to the managerial context.
- To enable students to see both the benefits, and limitations, of the techniques and problem structuring methods of scientific management in experimentation, manufacturing, and design.
- To familiarize the students with various scenarios of domestic and industrial applications where management techniques find their place.
- To induce them towards leadership and to develop an understanding of the general role of Small Business Enterprises

COURSE OUTCOMES:

On successful completion of this course the student will be able to:

CO1. Understand fundamental needs of a small business enterprise and identify the avenues for improvement.

CO2. Analyze lacunae in management practices in an organization and provide qualitative assessment of the possible remedies to address the lacunae.

CO3. Design administrative system and process flow for small enterprises for maximizing efficiency.

CO4. Apply problem-structuring methods used within Management Science.

CO5. Exercise discernment in implementing managerial decisions for ethical, safe, and sustainable operations of the business operations.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO MANAGEMENT

Concepts of management and organization - Nature and Importance of management - Evolution of management thought - Functions of management - Contributions of F.W. Taylor and Henri Fayol to the management - Systems approach to management - Managerial skills- Elements of corporate planning process - Environmental scanning - SWOT Analysis - Social responsibilities of management.

UNIT - II: DESIGNING ORGANIZATIONAL STRUCTURES

Basic concepts related to organization – Departmentation and decentralization - Types of organizations – Merits, demerits and adoptability to modern firms.

UNIT - III: OPERATIONS MANAGEMENT

Principles and types of plant layout - Methods of production - Forecasting - Forecasting methods - Work study - Basic procedure involved in method study and work measurement - Statistical quality control: Factors affecting quality - Quality control using control charts (simple problems) - Acceptance sampling.

UNIT - IV: MATERIALS MANAGEMENT

Materials management objectives – Inventory - Types of inventory– Safety stock - Classical EOQ model - Need for inventory control – EOQ simple problems - ABC analysis - Purchase procedure - Stores management.

Marketing: Functions of marketing - Marketing mix - Channels of distribution.

UNIT - V: HUMAN RESOURCES MANAGEMENT (HRM)

Nature and scope of HRM - HRD and personnel management and industrial relations - Functions of HRM - Role of HR Manager in an organization - Performance appraisal - Job evaluation and merit rating - Motivation - Importance of motivation - Maslow's theory of human needs - McGregor's theory X and theory Y - Herzberg's two-factor theory.

UNIT - VI: PROJECT MANAGEMENT (PERT/CPM)

Network analysis - Program evaluation and review technique (PERT)- Critical path method (CPM) - Identifying critical path - Probability of completing the project within given time - Project cost analysis - Project crashing (simple problems).

UNIT - VII: ENTREPRENEURSHIP

Introduction to entrepreneurship - Definition of an entrepreneur - Entrepreneurial traits - Entrepreneur vs. Manager - Entrepreneurial decision process - Role of entrepreneurship in economic development-Social responsibilities of entrepreneurs - Opportunities for entrepreneurs in India and abroad - Women as an entrepreneur.

UNIT - VIII: CONTEMPORARY MANAGEMENT PRACTICES

Basic concepts of Just-In-Time (JIT) system - Total quality management (TQM) - Value chain analysis - Enterprise resource planning (ERP) - Business process outsourcing (BPO) –

Globalization-Management challenges - Intellectual property rights- Supply chain management - Role of information technology in managerial decision making.

TEXT BOOKS:

1. O.P. Khanna, *Industrial Engineering and Management,* Dhanpat Rai and Sons, 2010.
2. Stoner, Freeman and Gilbert, *Management,* 6 ed, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane, *Marketing Mangement,* 12 ed, PHI, New Delhi, 2007.
2. Koontz and Weihrich, *Essentials of Management,* 6 ed, TMH, New Delhi, 2007.
3. N.D. Vohra, *Quantitative Techniques in Management,* 2 ed, TMH, New Delhi.
4. Heinz Weihrich and Harold Koontz*, Management- A Global Perspective,*10 ed, McGraw-Hill International.

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IV B. Tech I-Semester

(10BT71222) SOFTWARE ARCHITECTURE (ELECTIVE –II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	--	--	4

PREREQUISITE: *A Course on* " Software Engineering"

Course Description: Introduction to Software Architecture, architectural styles, shared information systems, architectural design guidance, pattern types, formal models and specifications, architectural description language and component based systems.

Course Objectives:

- To learn principles involved in software architecture and architectural styles.
- To acquire knowledge in software architecture styles, patterns and frameworks.
- To know the features of contemporary Architectural Description Languages and component based systems.

Course Outcomes:

1. Gain knowledge in
   - Software architecture
   - Styles and patterns
   - Frame works.
   - Architectural Description Language
   - Reusing Architectural Assets
2. Analyze and design architectural models and styles.
3. Apply Architectural Description Language on component based systems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO SOFTWARE ARCHITECTURE

Introduction to Software Architecture, Status of Software Architecture, Architecture Business Cycle, Software Architectures Evolution. Software Processes and the Architecture Business Cycle, Features of Good Architecture.

UNIT-II: ARCHITECTURE STYLES

Pipes and Filters, Data Abstraction and Object Oriented organization, Even-based Implicit Invocation, Layered Systems, Registers, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures.

UNIT-III: SHARED INFORMATION SYSTEMS
Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems.

UNIT-IV: ARCHITECTURAL DESIGN GUIDANCE

Guidance for User Interface Architectures, Case Study in Inter-operability: World Wide Web.

UNIT-V: PATTERN TYPES

Architectural Patterns, Structural Patterns, Patterns for Distribution, Patterns for Interactive Systems.

UNIT-VI: FORMAL MODELS AND SPECIFICATIONS

Finalizing the Architectural of a Specific System, Architectural Styles, Architectural Design Space, Case Study: CORBA.

UNIT-VII: ARCHITECTURAL DESCRIPTION LANGUAGES (ADL)

Contemporary, ADL's today, Capturing Architectural Information in an ADL, Application of ADL's in system Development, Choosing an ADL, Example of ADL.

UNIT-VIII: REUSING ARCHITECTURAL ASSETS WITHIN AN ORGANIZATION

Creating Products and Evaluating a Product Line, Organizational Implications of a Product Line, Component Based Systems. Software Architectures in Figure Legacy Systems.

TEXT BOOKS:

1. Mary Show, David Garlan, *S/W Arch. Perspective: on an Emerging Discipline*, PHI, 1996.
2. Len Bass, Paul Elements, *Rick Kazman, Software Architecture in Practice*, PEA, 1998.

REFERENCE BOOKS:

1. Garmus, Herros, *Measuring the Software Process: A Practical Guide to Functional Measure*, PHI, 1996.
2. Florac, Carleton, *Meas. Software Process: Stat. Proce. Cont. for Software process Improvements*, PEA, 1999.
3. W.Humphery, *Introduction to Team Software Process*, PEA, 2002.
4. Peters, *Software Design: Methods and Techniques*, Yourdon, 1981.
5. Buschmann, *Pattern Oriented Software Architecture*, Wiley, 1996.
6. Gamma et al, *Design Patterns*, PEA, 1995.
7. Gamma, Shaw, *An Introduction to Software Architecture, World Scientific*, 1995.
8. Shaw, Gamma, *Software Architecture*, PHI, 1996.

IV B. Tech I-Semester

(10BT7HS01) PROFESSIONAL ETHICS (AUDIT COURSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	3	-	-

Course Description:

Introduction to engineering ethics; Professional characteristics; Role of engineering in social experimentation; Rights and responsibilities of engineers; Global issues in ethics; Ethics for engineers in various roles.

Course Objectives:

CEO1. To impart knowledge in professional ethics pertaining to the field of engineering.

CEO2. To analyze ethical issues and take corrective measures.
CEO3. To apply ethics in business environment.
CEO4. To imbibe ethical behavior in all aspect of human life.

Course Outcomes:

On successful completion of the course the students will be able to
CO1. Demonstrate knowledge in engineering ethics.
CO2. Analyze ethical issues for corrective action.
CO3. Develop ethical environment in public and business environment.
CO4. Investigate and synthesize available information to provide valid conclusions in public and business environment.
CO5. Apply ethical issues in day-to-day life in harmonious with the society.
CO6. Follow environmental ethics while conducting business.
CO7. Apply ethical principles and commit to professional ethics, norms and responsibilities and norms of the engineering practice.

DETAILED SYLLABUS:

UNIT-I: ENGINEERING ETHICS

Scope and aims of engineering ethics-Senses of Engineering Ethics- Variety of Moral Issues-Types of Inquiry- Moral Dilemmas,- Moral Autonomy- Kohlberg’s Theory, Gilligan’s theory, Consensus and Controversy.

UNIT-II: PROFESSIONAL IDEALS AND VIRTUES

Theories about virtues, professional responsibility, integrity, self-respect, sense of “responsibility”. Self-Interest, Customs and Religion- Self-interest and ethical egoism, customs and ethical relativism, religion and divine command ethics. Use of ethical theories- resolving moral dilemmas and Moral leadership.

UNIT-III: ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation- similarities to standard experiments, learning from the past and knowledge gained. Engineering as Responsible experiments-Conscientiousness. Moral autonomy and accountability, the challenger case.

UNIT-IV: RESPONSIBILITIES AND RIGHTS

Collegiality and Loyalty, Respect for authority, collective bargaining, confidentiality, conflict of interests, occupational crime. Rights of Engineers- Professional rights, whistle-blowing, The bart case, employee rights and discrimination.

UNIT-V: GLOBAL ISSUES

Multinational corporations-Professional ethics, environmental ethics, computer ethics, Engineers as Managers, Consultants and Leaders. Engineers as managers – Managerial ethics applied to engineering profession.

TEXT BOOKS:

1. Mike W. Martin, Roland Schinzinger, *Ethics in Engineering*, Tata McGraw-Hill, 3 ed, 2007.

2. Govindarajan M, Nata Govindarajan. M, Natarajan. S, Senthilkumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. Dr. S. Kannan, K. Srilakshmi, *Human Values and Professional Ethics*, Taxmann Allied Services Pvt Ltd., 2009.

2. Edmund G seebauer and Robert L Barry, *Fundamental of Ethics for scientists and Engineers*, Oxford University Press, Oxford, 2001.

3. Charles F Fledderman, *Engineering Ethics*, Pearson education/Prentice Hall, NewJercy, 2004 (Indian Reprint).

III - B.TECH II - SEMESTER

10BT50423: **PRINCIPLES OF COMMUNICATIONS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE REQUISITE: Signals and Systems

COURSE DESCRIPTION:

Communication systems; analog and digital: Modulation and Demodulation Techniques; Coding efficiency and error control coding.

COURSE OUTCOMES: After completion of the course the students will be able to:

1. Demonstrate knowledge on functional blocks of analog and digital communication systems
2. Analyze and synthesis analog and digital transceivers

DETAILED SYLLABUS :

UNIT I
Introduction: Block diagram of Electrical Communication System, Radio Communication: Types of Communications, Analog, Pulse and Digital types of Signals, Fourier Transform for various Signals, Fourier Spectrum, Power Spectral Density, Autocorrelation, Cross Correlation, Convolution.

UNIT II
Amplitude Modulation: Need for Modulation, Types of Amplitude Modulation, AM, DSBSC, SSBSC, Power and BW requirements, generation of AM, DSBSC, SSBSC, demodulation of AM: Diode detector, Product demodulation for DSBSC & SSBSC.

UNIT III
Angle Modulation: Frequency & Phase Modulations, advantages of FM over AM, Bandwidth consideration, Narrowband and Wideband FM, generation and demodulation of FM, Comparison of FM & PM.

UNIT IV
Pulse Modulations: Sampling, Nyquist rate of Sampling, Sampling theorem for Band limited Signals, PAM, regeneration of Base band Signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT V
Pcm Schemes: Advantages, Block diagram of PCM, Quantization, effect of Quantization, Quantization error, Base band Digital Signal, DM, ADM, ADPCM and Comparison.

UNIT VI
Digital Modulation: ASK, FSK, PSK, QPSK, DPSK, QAM, Modulation and Demodulation, Coherent and Incoherent, Modems.

UNIT VII
Information Theory: Concept of Information, Rate of Information and Entropy, Source Coding for optimum rate of Information, Coding efficiency, Shanon-Fano and Huffman Coding.

UNIT VIII

Error Control Coding: Introduction, Error Detection and Correction Codes, Block Codes, Convolutional Codes.

TEXT BOOKS:

1. Simon Haykin, *Communication Systems,* 2nd Edition, John Wiley, 2008.
2. R.P. Singh and S D Sapre, *Communication Systems Analog and Digital,* TMH, 2006.
3. H. Taub and D. Schilling, *Principles of Communication Systems,* TMH, 2003.

REFERENCES:

1. Kennedy and Davis, *Electronic Communication Systems,* 4th Edition, TMH, 2004.
2. John. G. Proakis and Masoud Salehi, *Communication Systems Engineering,* 2nd Edition, PHI, 2004.

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SREE SAINATH NAGAR, A. RANGAMPET – 517 102

SVEC-10 Regulations

IV B. Tech II-Semester

(10BT80502) HUMAN COMPUTER INTERACTION
(ELECTIVE-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	--	4

PREREQUISITE: *Nil*

Course Description: Importence of user interface, graphical user interface, design process, screen designing, windows, components, software tools and interaction devices.

Course Objectives:

- To acquire knowledge in Graphical user interface Design principles, methods, windows, components, tools, relation between formal design methods and system usability and acceptance.
- To develop and design guidelines, models and methods to provide better computer systems and promote user-orientation.
- To apply the knowledge of Interface design Principles in analysis, design, and evaluation of computer systems.

Course Outcomes:

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

CO1. Gain knowledge in

- The Graphical User Interface and Design Process
- Screen Designing and Windows Components
- Software Tools and Interaction Devices

1. Develop design using modern tools, usability and experimental testing, and evaluation of human computer interaction systems.
2. Communicate effectively with peers and experts about requirements, design, and evaluation activities relating to Human Computer Interaction.
3. Design, Develop and Implement an interface work either individually or in Teams

DETAILED SYLLABUS:

UNIT I: INTRODUCTION

Importance of user Interface – definition, importance and benefits of good design, a brief history of Screen design.

UNIT II: THE GRAPHICAL USER INTERFACE

Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user interface-popularity, characteristics, Principles of user interface design.

UNIT III: DESIGN PROCESS

Human interaction with computers, importance of human characteristics, human consideration in design, Human interaction speeds, Understanding business functions.

UNIT IV: SCREEN DESIGNING

Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V: WINDOWS

System menus and Navigation schemes, selection of window, selection of devices based controls and screen based controls, organize and layout windows and web pages, Touch screen and surface computing.

UNIT VI: COMPONENTS

Text and messages, Icons and images, Multimedia.

Colours - uses, problems with colours, choosing colours.

UNIT VII: SOFTWARE TOOLS

Specification methods-Grammars, Menu-Selection and Dialog-box trees, Transition diagrams, State charts, Interface Building Tools-Interface mockup tools, Software-engineering tools.

UNIT VIII: INTERACTION DEVICES

Keyboard and function keys – pointing devices – speech recognition, digitization and generation, image and video displays.

TEXT BOOKS:

1. Wilbert O Galitz, *The Essential Guide to user Interface Design*, 2 ed, Wiley India Education.
2. Ben Shneidermann, *Designing the user interface*, 3 ed, Pearson Education Asia.

REFERENCE BOOKS:

1. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Rssell Bealg, *Human Computer Interaction*, 3 ed, Pearson, 2004.
2. Preece, Rodgers, Sharps, *Interaction Design*, 3 ed, Wiley Dreamtech, 2011.
3. Soren Lauesen, *User Interface Design*, Pearson Education, 2005.

IV - B.Tech II – Semester

10BT61302: **ROBOTICS AND AUTOMATION**

(ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PREREQUISITES: Physics and control systems.

COURSE DESCRIPTION:

Automatic production and assembly; sensors, actuators and drives; mechanization of part handling, industrial robots, and vision systems; Emphasis will be on the planning, design and implementation of automation systems.

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

1. Explain the basic principles of Robotic technology, configurations, control and programming of Robots.
2. Design an industrial robot which can meet kinematic and dynamic constraints.
3. Select the appropriate Sensor and Machine vision system for a given application.

DETAILED SYLLABUS :

UNIT I
Fundamentals of Manufacturing and Automation: Automation, Types of Automation, Arguments for and against automating, manufacturing industries, manufacturing functions and automation strategies, fundamentals of cad/cam.

UNIT II
Introduction to Robotics: Human factors in automated factories, An overview of Robotics, Laws of robotics, Industrial Robotics – classification by coordinate system and control system, Electronic and Pneumatic manipulators, Present and Future applications.

UNIT III
Power Sources and Sensors: Hydraulic, Pneumatic and electric drivers, Motor HP determination and gearing ratio, variable speed arrangements, Path Determination, Machinery Vision, Ranging, Laser, Acoustic, Magnetic Fiber Optic and Tactile Sensor.

UNIT IV
Actuators and Grippers: Pneumatic, Hydraulic Actuators, Stepper Motor Control Circuits, End Effecter, Various types of Grippers, Design consideration.

UNIT V
Kinematics and Dynamics: Differential transformation and manipulators, Jacobians, problems. Dynamics : Lagrange, Euler and Newton, Euler formations, Problems, Forward and Inverse Kinematics Problems, Solutions of Inverse Kinematic problems, Multiple Solution, Jacobian Work Envelop.

UNIT VI
Robot Programming: Robot programming- Lead through methods, textual robot languages, position specification, motion interpolation, Basic programming languages.

UNIT VII

Flexible Manufacturing Systems and Automated Material Handling: Automated material handling and storage systems, conveyor systems and automated guided vehicle systems, FMS workstations, applications and benefits.

UNIT VIII

Robot Applications in Manufacturing: Multiple Robots, Artificial intelligence and Robotics, Robots in Manufacturing and Non-Manufacturing applications – Robot Cell Design and control.

TEXT BOOKS:

1. Groover, M.P., Mitchell Weiss, Nagel,R.N., Nicholas G.Odrey, *Industrial Robotics Technology, Programming and Applications*, McGraw Hill International Edition, 1986.
2. S. R. Deb, *Robotics Technology and flexible Automation*, TMH.

REFERENCES:

1. R. K. Mittal, I. J. Nagrath, *Robotics and Control,* TMH, 2003
2. R.D.Klafter, T.A. Chimielewski and M.Negin, *Robotic Engineering – An integrated Approach* , PHI, 1989
3. K. S. Fu., R. C. Gonzalez, C. S. G. Lee, International Edition, *Robotics: Control Sensing, Vision and Intelligence*, McGraw Hill Company
4. Mikell P. Grower. *Automation, Production Systems and CIM*, PHI, 1987
5. Jhon J Craig, *Introduction to Robotics Mechanics and Control*, 2^{nd} Edition, Pearson Education.

II B. Tech II-Semester

(10BT3BS02) ENVIRONMENTAL SCIENCES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	--	--	4

PRE-REQUISITES: Nil

COURSE DESCRIPTION:

Introduction to environment, Need for public awareness; Natural resources, conservation and management; Ecology and ecosystems; Biodiversity, conservation and management; Environment pollution and Control; Social issues and environment; Human population and environment; Field study and analysis

COURSE OBJECTIVES:

1. To impart knowledge on various natural resources and their conservation practices.
2. To analyze the problems of environmental pollution, health hazards and follow appropriate remedial measures.
3. To bring awareness on environmental legislation and environmental ethics for sustainable development.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

1. Demonstrate knowledge in
    - Different components of environment and natural resources.
    - Green technology
    - Ecology and Ecosystems
    - Biodiversity and its conservation
    - Population and Human health
2. Identify sources of pollution and provide suggestions for protection of natural resources.
3. Follow environmental ethics to protect the diversified ecosystems and make environment sustainable.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO ENVIRONMENTAL SCIENCES

Definition and concept of the term environment – Various components of environment – Abiotic and biotic – Atmosphere – Hydrosphere – Lithosphere – Biosphere – Inter relationships – Need for public awareness – Role of important national and international individuals and organizations in promoting environmentalism.

UNIT - II: NATURAL RESOURCES, CONSERVATION AND MANAGEMENT

Renewable and Non renewable resources and associated problems– Forests: Deforestation, Causes, effects and remedies – Effects of mining, dams and river valley projects – case studies; Water resources: Water use and over exploitation – Conflicts over water – Large dams – benefits and problems; Food resources: World food problems – Adverse effects of modern agriculture – Fertilizer and pesticide problems; Land resources: Land degradation– Land slides- Soil erosion – desertification- water logging – salinity – Causes, effects and remedies; Mineral resources: Mining – Adverse effects; Energy resources: Growing needs – Renewable and Non renewable resources – Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear energy, Hydrogen fuel and Solar energy - Impact on environment - Sustainable life styles.

UNIT - III: ECOLOGY AND ECOSYSTEMS

Definitions and concepts – Characteristics of ecosystem – Structural and functional features – Producers, consumers and decomposers and food webs – Types of ecosystems – Forests grassland, desert, crop land, pond, lake, river and marine ecosystems – Energy flow in the ecosystem – Ecological pyramids – Ecological successions.

UNIT - IV: BIO DIVERSITY, CONSERVATION AND MANAGEMENT

Introduction – Definition and concept of biodiversity – Value of biodiversity – Role of biodiversity in addressing new millennium challenges – Global, national biodiversity – Hot spots of biodiversity– Threats to biodiversity – Man and wild life conflicts – Remedial measures – Endemic, endangered and extinct species – In-situ and ex-situ conservation of biodiversity.

UNIT - V: ENVIRONMENTAL POLLUTION AND CONTROL

Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution – Solid waste management – Causes, effects, control and disposal methods – Role of individuals in the prevention of pollution – Hazards and disaster management – Floods – Earthquakes – Tsunamis – Cyclones – Land slides – Case studies.

UNIT - VI: SOCIAL ISSUES AND THE ENVIRONMENT

Concept of sustainable development – Methods of rainwater harvesting – Watershed management – Waste land reclamation – Green cover – Green power – Green technology – Resettlement and rehabilitation of people and related problems – Case studies – Issues and possible solutions - Greenhouse effect and global warming – Carbon credits – Acid rains –

Ozone layer depletion – Causes, effects and remedies – Consumerism and waste production– Environment protection acts – Air act – Water act – Forest conservation act – Wild life protection act – Issues involved in the enforcement.

UNIT - VII

HUMAN POPULATION AND ENVIRONMENT

Population growth and its impact on environment – Environmental ethics – Family welfare programmes – Human health: T.B., Cancer, HIV/AIDS – Causes, effects and remedies – Occupational health hazards – Human rights – Important international protocols and conventions on environment.

UNIT - VIII

FIELD WORK/ENVIRONMENTALIST'S DIARY/ASSIGNMENTS/SEMINARS

TEXT BOOKS:

1. Erach Barucha, *Environmental Studies*, 1 ed, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies,* 3 ed, New Age International Publishers, 2011.

REFERENCE BOOKS:

1. Desh wal, *Environmental Studies,* 2 ed, Khanna Publications, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies,* 1 ed, Oxford University Press, 2009.
3. Joseph Benny, *Environmental Studies,* 2 ed, Tata McGraw-Hill, New Delhi, 2010.

III - B.TECH I - SEMESTER

10BT40501: COMPUTER ARCHITECTURE AND ORGANIZATION

(Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: Fundamentals of Digital Systems and Logic Design

COURSE DESCRIPTION:

Structure of Computers; Register Transfer and Micro-Operations; Micro-programmed Control; Pipeline and Vector Processing; the Memory System, Input-Output Organization; Multi-Processors and Case studies.

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

1. Demonstrate knowledge on organization of basic building blocks of digital computer, Peripheral devices, Buses, Register Transfer Language, Communication protocols, Multiprocessors, RISC and CISC architectures. (PO1)

2. Understand the operation of the arithmetic unit and implementation of fixed-point and floating-point addition, subtraction, multiplication & division. (PO2)

3. Apply concepts of pipelining, vector processing and multiprocessing to enhance the performance. (PO4)

DETAILED SYLLABUS :

UNIT I

Basic Structure of Computers: Computer Types, Functional Units, Basic Operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputers.

Computer Arithmetic: Review of Representation of Information**,** Addition and Subtraction, Multiplication and Division Algorithms, Floating-Point Arithmetic Operation, Decimal Arithmetic Unit, Decimal Arithmetic operations.

UNIT II

Register Transfer 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, Instruction Codes, Computer Registers, Computer Instructions, Instruction Cycle, Timing and Control, Memory-Reference Instructions, Input-Output and Interrupt.

Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC). Comparison of RISC and CISC.

UNIT III

Microprogrammed Control: Control Memory, Address Sequencing, Micro-program Example, Design of Control Unit, Hardwired Control, Micro-programmed Control, Nanoprogramming.

UNIT IV

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path & Control Consideration, Superscalar Operations, Vector Processing, Array Processors.

UNIT V

The Memory System: Basic Concepts, Semiconductor RAM, Types of Read-only memory (ROM), Cache Memory, Performance Considerations, Virtual Memory, Secondary Storage, and Introduction to Redundant Array of Inexpensive Disks (RAID).

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).

UNIT VI

Input-Output Organization: Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols like RS232, USB, and IEEE1394.

UNIT VII

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherance, Shared Memory Multiprocessors.

UNIT VIII

Case Study: CISC and RISC Architectures, Pentium4, PowerPC.

TEXT BOOKS:

1. M. Moris Mano, Computer Systems Architecture, 3rd Edition, PHI, 2008.
2. Carl Hamacher, Zvonks Vranesic & SafeaZaky, *Computer Organization*, 5th Edition, McGraw Hill, 2002.

REFERENCES:

1. William Stallings, *Computer Organization and Architecture*, 6th Edition, PHI.
2. Andrew S. Tanenbaum, *Structured Computer Organization*, 4th Edition, PHI.
3. Sivaraama Dandamudi, *Fundamentals or Computer Organization and Design*, Springer Int. Edition.
4. John P. Hayes, *Computer Architecture and Organisation*, 3rd Edition, TMH, 1998.

II - B.TECH II - SEMESTER

10BT41301: **CONTROL SYSTEMS**

(Common to ECE, EIE & EConE)

Int. Marks	**Ext. Marks**	**Total Marks**	**L**	**T**	**P**	**C**
30	70	100	4	1	-	4

PREREQUISITE: Engineering mathematics, Circuit Theory

COURSE DESCRIPTION:

Open loop and closed loop systems; time domain and frequency domain analysis for stability; lead and lag compensation circuits; state space analysis.

COURSE OUTCOMES: After successful completion of the course the student is able to

1. Demonstrate knowledge in
   - Representation of physical systems
   - Time and frequency domain specifications for stability analysis.
   - Methods of determining the stability of the system
   - Concept of controllability and observability.
2. Analyze the stability of the system in time and frequency domains.
3. Design compensators to meet the desired specifications.
4. Demonstrate problem solving skills in
   - Deducing the transfer function using block diagram reduction technique and signal flow graph.
   - Evaluating the system stability in time and frequency domains.
   - Solving the state equations of a system.
   - Evaluating controllability and observability of a system.

DETAILED SYLLABUS :

UNIT I
Introduction: Concepts of Control Systems, Open Loop and closed loop control systems, Feed-Back Characteristics, Effects of feedback, Block diagram representation of physical systems, Mathematical models-differential Equations.

UNIT II
Transfer Function Representation: Analogous systems, electrical analogy of physical systems, Derivation of transfer function, Transfer function of DC Servo motor, Synchro transmitter and receiver, Block diagram algebra, Signal Flow graph and Mason's gain formula.

UNIT III
Time Response Analysis: Types of test signals, Response of first and second order system, Time domain specifications, type and order of systems, steady state error, static error constants, generalized error co-efficients. Effect of P, PI, PID on time response.

UNIT IV
Stability Analysis in S-Domain: Concepts of stability: Characteristic equation, location of roots in s-plane for stability, asymptotic stability and relative stability, Routh-Hurwitz stability criterion.
Root Locus Technique: Root locus concept, construction of root loci, effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT V

Frequency Response Analysis: Introduction, Frequency domain specifications, Bode diagrams, Determination of Frequency domain specifications and transfer function from the Bode Diagram, Phase margin and Gain margin, Stability Analysis from Bode Plots.

UNIT VI

Stability Analysis in Frequency Domain: Polar Plots, Nyquist plots, stability in frequency domain using Nyquist stability criterion, simple problems.

UNIT VII

Design and Compensation of Control Systems: Introduction to Compensation networks, Lag, Lead, lead-lag compensation, Compensation using Bode plots.

UNIT VIII

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state model for physical systems Diagonalization, State Transition Matrix and its Properties, Solution of linear state equation, Concepts of Controllability and Observability, Kalman's test only.

TEXT BOOKS:

1. I. J. Nagrath and M. Gopal, *Control Systems Engineering,* 2nd Edition, New Age International (P) Limited.
2. Katsuhiko Ogata, *Modern Control Engineering,* 3rd Edition, Prentice Hall of India Pvt. Ltd.,

REFERENCES:

1. B.C.Kuo, *Automatic Control Systems*, Weilly Eastern, 2004
2. NISE, Control Systems Engineering, 3rd Edition, John wiley.
3. Richard C. Dorf, Robert H. Bishop, *Modern Control Systems,* 11th Edition, Pearson Education, 2007
4. Graham Goodwin, Stefan Graebe and Mario Salgado, *Control System Design,* PHI

III - B.TECH I - SEMESTER

10BT50422: LINEAR AND DIGITAL IC APPLICATIONS

(Common to EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITE : Circuit Theory, Semiconductor Devices & Circuits, Switching Theory and Logic Design, Problem solving and computer programming.

COURSE DESCRIPTION:

Fundamentals of operational amplifiers; development of linear and non linear op-amp based applications; design and development of digital IC's and its applications, modelling of digital IC's using VHDL.

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

1. Demonstrate basic knowledge in operational amplifiers, Digital IC logic families and programming of digital circuits using VHDL.
2. Use analytical skills to
   - Determination of op-amp parameters – frequency, gain, currents, voltages, resistance, CMRR, offsets.
   - Determination of voltage levels, resistances, delays, fan-in, fan-out, power consumption etc.
3. Design
   - Linear and non linear applications of op-amps for required gain, voltage, current levels,
   - bandwidth, impedance, symmetric and asymmetric waveform generators.
   - Compensation circuits for offsets, drifts.
   - Digital circuits using different IC logic families.
4. Apply techniques and IT tools for modelling of digital circuits using VHDL.

DETAILED SYLLABUS :

UNIT I
Differential Amplifier, Characteristics of OP-Amps, Integrated circuits, Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Output offset voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT II
Linear & Non-Linear Applications of Op-Amps: Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. Non-Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Antilog amplifiers, Precision rectifiers.

UNIT III
Timers & Phase Locked Loops: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL, introduction, block schematic,

principles and description of individual blocks, 565 PLL, Applications of PLL, frequency multiplication, frequency translation, AM, FM & FSK.

UNIT IV

CMOS Logic: Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT V

Bipolar Logic and Interfacing: Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series ICs, Specifications.

UNIT VI

The VHDL Hardware Description Language: Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT VII

Combinational Logic Design: Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT VIII

Sequential Logic Design: Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

TEXT BOOKS:

1. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs,* PHI, 1987.
2. John F. Wakerly, *Digital Design Principles & Practices,* 3rd Edition, PHI/Pearson Education Asia, 2005.
3. Charles H. Roth Jr., *Digital System Design Using VHDL,* 1st Edition, Cengage Publications.

REFERENCES:

1. James M.Fiore *Op amps & Linear Integrated Circuits Concepts & Applications,* Cengage 2009
2. D. Roy Chowdhury, *Linear Integrated Circuits,* 2nd Edition, New Age International (p) Ltd, 2003
3. J. Bhasker, *VHDL Primer,* 3rd Edition, Pearson Education/ PHI.

III - B.TECH I - SEMESTER

10BT50421: ELECTROMAGNETIC THEORY

(Common to EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE REQUISITE: Engineering Mathematics and Engineering Physics.

COURSE DESCRIPTION:

vector-calculus; Static electric and Magnetic fields; time varying electromagnetic Fields; Maxwell's equations; Wave equations and wave propagation; electromagnetic interference and compatibility.

COURSE OUTCOMES: After completion of the course the students will be able to:

1. Demonstrated Knowledge on static and time varying: electric and magnetic fields, Maxwell's equations, wave propagation, Interference and Compatibility in the field of electromagnetics. (PO1)

2. Formulate and analyse problems related to electromagnetics in different mediums(PO2)

3. Apply coulombs law, Gauss's law, biot savarts law and amperes law to measure the exisistance of electric and magnetic fields. (PO4)

Review of Coordinate Systems, Vector Calculus.

DETAILED SYLLABUS :

UNIT I
Electrostatic Fields: Coulomb's Law, Electric Field Intensity: Fields due to different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations between E and V, Energy Density, Related Problems.
UNIT II
Electric Fields in Material Space: Properties of Materials, Convection and Conduction Currents, conductors, Relaxation Time, Dielectrics and polarization, boundary conditions, Poisson's and Laplace's Equations; Capacitance: Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.
UNIT III
Magnetostatics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Magnetic Scalar and Vector Potentials, Lorentz force law, Ampere's Force Law, Magnetic Energy, Self and mutual Inductances and Related Problems.
UNIT IV
Maxwell's Equations (Time Varying Fields): Faraday's Law and Lenz's law. Continuity Equation, Inconsistency of Ampere's Law, Maxwell's Equations in various forms. Boundary Conditions: Dielectric-Dielectric and Dielectric-Conductor Interfaces, Related Problems.
UNIT V
EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves: Definition, All Relations Between E & H. Sinusoidal Variations. Wave Propagation in Lossless and Conducting Media. Conductors & Dielectrics: Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization of wave, Related Problems.
UNIT VI
EM Wave Characteristics - II: Reflection and Refraction of Plane Waves, Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle,

Critical Angle and Total Internal Reflection, Surface Impedance. Poynting Vector and Poynting Theorem: Applications, Power Loss in a Plane Conductor. Related Problems.

UNIT VII

Introduction to EMI: Definition of EMI and EMC, Classification, Natural and man-made EMI sources, Switching transients, Electrostatic Discharge, Nuclear Electromagnetic, Pulse and High Power Electromagnetics.

UNIT VIII

Introduction to EMC: Grounding, Principles and practice of earthing, precautions in earthing, measurement of ground resistances, system grounding for EMC, cable shielding grounding. Shielding: Theory of effectiveness, materials, integrity at discontinuities, conductive coatings, cable shielding, effectiveness measurements, electrical bonding.

TEXT BOOKS:

1. Matthew N.O. Sadiku, *Elements of Electromagnetics,* 3rd Edition, Oxford University Press, 2001.
2. E.C. Jordan and K.G. Balmain, *Electromagnetic Waves and Radiating Systems,* 2nd Edition, PHI, 2000.
3. Kodali Prasad V, *Engineering Electromagnetic Compatibility*, S Chand, 2000.

REFERENCES:

1. William H Hayt Jr, John A. Buck, Engineering Electromagnetics, 7th Edition, TMH, 2006.
2. SA Nasar, Schuams solved problems series, *2000 Solved Problems in Electromagnetics,* Mc-Graw Hill Company, 1992.
3. Christos Christopoulos, *Principles and Techniques of Electromagnetic Compatibility,* 2nd Edition, CRC Press (Taylor & Francis Group), 2007.
4. Clayton R. Paul, *Introduction to Electromagnetic Compatibility,* John Wiley & Sons, 1992.

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SVEC-10 Regulations

II B. Tech II-Semester
(10BT40503) PRINCIPLES OF PROGRAMMING LANGUAGES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PREREQUISITES: Nil

COURSE DESCRIPTION: Concepts of Programming Languages, Paradigms; Different data types; Arithmetic and Boolean expressions, Programming Statements; Fundamental of subprograms; Data abstraction; Exception handlers; Functional and imperative languages; Binding and Scope in Scripting Language.

Course Objectives:

- To gain knowledge on programming paradigms.
- To gain skills on the usage of functional programming and scripting languages.

Course Outcomes:

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

1. Gain knowledge in Key features of programming languages such as data types, expressions, statements, subprograms, blocks and abstract data types , Exceptional handling related to object oriented programming.
2. Acquire skills on functional programming languages such as LISP, ML, HASKELL and SQL and scripting languages like Python, PERL, PHP and ABAP to solve real time problems.

DETAILED SYLLABUS:

UNIT-I: PRELIMINARY CONCEPTS

Concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms: Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation, Compilation and Virtual Machines, Programming environments, Introduction to Syntax and Semantics.

UNIT-II: DATA TYPES

Introduction, primitive, character, String, user-defined, array, associative arrays, records, set, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

UNIT-III: EXPRESSIONS AND STATEMENTS

Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures: Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

UNIT-IV: SUBPROGRAMS AND BLOCKS

Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co-routines.

UNIT-V: ABSTRACT DATA TYPES

Abstractions and encapsulation, introductions to data abstraction, design issues, Concept of Object, Inheritance, Derived classes , language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95, Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

UNIT-VI: EXCEPTION HANDLING

Exceptions, exception Propagation, Exception handler in Ada, C++ and Java. Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

UNIT-VII: FUNCTIONAL PROGRAMMING LANGUAGES

Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages, Database Query Languages(using SQL as Example).

UNIT-VIII: SCRIPTING LANGUAGES

Case Study : Python, PERL,PHP,ABAP – Key concepts ,Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

TEXT BOOKS:

1. Robert W. Sebesta, *Concepts of Programming Languages*, 8 ed, Pearson Education, 2008.
2. D. A. Watt, *Programming Language Design Concepts*, Wiley Dreamtech, RP-200.

REFERENCE BOOKS:

1. A.B. Tucker, R.E. Noonan, *Programming Languages*, 2 ed, TMH.
2. K.C. Louden, *Programming Languages*, 2 ed, Thomson, 2003.
3. Patric Henry Winston and Paul Horn, *LISP*, 2 ed, Pearson Education.
4. M. Lutz, *Programming Python*, 3 ed, O'Reilly, SPD, RP-2007.

II B. Tech. - I Semester

14BT30235: BASIC ELECTRICAL ENGINEERING

(Common to CSE&IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: A course on "Engineering physics"

COURSE DESCRIPTION:
Basics of electrical circuits and measuring instruments, principle of operation, characteristics and applications of DC machines, transformers, three phase induction motors and special machines.

COURSE OUTCOMES: On successful completion of this course, students will be able to

CO1. demonstrate knowledge on
- basics of electrical circuits.
- Construction and working principle of various electrical machines and various measuring instruments.

CO2. analyze the behavior of electrical circuits and operation of several electrical measuring instruments.

CO3. develop skills to evaluate various circuit parameters and performance characteristics of various machines.

DETAILED SYLLABUS:

UNIT-I: ELECTRICAL CIRCUITS (13 periods)
Essence of electricity, basic circuit components, electric current, potential difference, EMF, electric power, Ohm's law, resistive networks, inductive networks, capacitive networks, Kirchhoff's laws, series-parallel circuits, star to delta and delta to star transformations. Mesh analysis, nodal analysis, source transformation technique, numerical problems.

UNIT -II: ALTERNATING QUANTITIES (9 periods)
Principle of AC voltages, wave forms and basic definitions, RMS and average values of alternating currents and voltages for sinusoidal waveform, form factor and peak factor, power factor and concept of power triangle.
Polyphase systems, advantages, voltages and currents in balanced star and delta connections, numerical problems, advantages of star and delta connections.

UNIT -III: DC MACHINES (9 periods)

DC Generators-constructional details, principle of operation, EMF equation, types and applications.

DC Motors - principle of operation, significance of back EMF, types, torque equation, losses, efficiency and applications.

UNIT- IV: AC MACHINES (8 periods)

Transformers - principle of operation, constructional details, losses, efficiency and regulation.

Three phase Induction motors -constructional details, operating principle and applications.

Principle of operation and applications-split phase induction motors, AC servomotor and stepper motor.

UNIT-V: MEASURING INSTRUMENTS AND SPECIAL APPARATUS (6 periods)

Classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil and moving iron instruments(voltmeters and ammeters), digital multi-meters, voltage stabilizers, uninterruptible power supply (UPS).

(Total Periods: 45)

TEXT BOOKS:

1. V.K.Mehta, Rohit Mehta, Principles of Electrical Engineering, S. Chand and Company Ltd., New Delhi, 2006.

2. T.K. Nagasarkar, M.S. Sukhija, Basic Electrical Engineering, Oxford University Press, New Delhi, 2010.

REFERENCE BOOKS:

1. B.L. Theraja, A.K. Theraja, A text book of electrical technology in SI units, Vol.2,S.Chand and Company Ltd., New Delhi, 2013.

2. D P Kothari, I J Nagarath, Basic Electrical Engineering, 3rd edition Tata McGraw Hill Education private Limited, New Delhi, 2012.

3. Ali Emadi, Abdolhosein Nasiri, Stoyan B.Bekiarov, Uninterruptible power supplies and active filters, CRC press, USA, 2005.

4. R.K.Rajput, Basic electrical and electronicsengineering, Laxmipublications(P)Ltd., New Delhi,2007.

II B.Tech - II Semester

14BT41501: **COMPUTER GRAPHICS**

(Common to CSE & CSSE)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: A courses on "Engineering Mathematics", "Problem solving and computer programming"

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COURSE DESCRIPTION: Introduction to Computer Graphics; Output Primitives; 2-D Geometric Transformations and Viewing; 3-D Geometric Transformations and Viewing; 3-D object representation; Visible Surface Detection Methods.

COURSE OUTCOMES:

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

CO1. Gain knowledge on graphical interactive devices, viewing transformations, 3-D object representations and surface detection methods.

CO2. Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.

CO3. Apply Transformations and Clipping algorithms for 2-D and 3-D objects.

UNIT -I: INTRODUCTION AND OUTPUT PRIMITIVES (10 periods)

Application areas of Computer Graphics, Overview of graphics systems, Video-display devices, Raster-scan systems, Random scan systems, Graphics monitors and work stations and input devices.

Output Primitives: Points and lines, Line drawing algorithms, Mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, Boundary-fill and flood-fill algorithms.

UNIT -II: 2-D GEOMETRICAL TRANSFORMATIONS AND 2-D VIEWING (10 periods)

Translation, scaling, rotation, reflection and shear transformations, homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, Viewing coordinate reference frame, Window to view-port coordinate transformation, Viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland - Hodgeman polygon clipping algorithm.

UNIT -III: 3-D OBJECT REPRESENTATION

(8 periods)

Polygon surfaces, Quadric surfaces, Spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.

UNIT -IV: 3-D GEOMETRIC TRANSFORMATIONS

(8 periods)

Translation, Rotation, Scaling, Reflection and shear transformations, Composite transformations.
3-D Viewing: Viewing pipeline, Viewing coordinates, Projections and clipping.

UNIT -V: VISIBLE SURFACE DETECTION METHODS

(9 periods)

Classification, Back-face detection, Depth-buffer, Scan-line, Depth sorting, BSP-tree methods, Area sub-division and octree methods, Shading: Gouraud Shading, Phong shading.

(Total periods: 45)

TEXT BOOK:

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C version", Pearson Education, 2006.

REFERENCE BOOKS:

1. Steven Harrington, "Computer Graphics", TMH, 1982.
2. Neuman and Sproul, "Principles of Interactive Computer Graphics", TMH, 2005.

IV B. Tech I-Semester

(10BT70501) PRINCIPLES OF COMPILER DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: A Course on Theory of Computation.

COURSE DESCRIPTION: Introduction to system software - compilers, assemblers; Working of a compiler; Design of compilers and optimization techniques, Compiler writing tools; Language specifications, usage of regular expression and context free grammars.

Course Objectives:

- To impart Knowledge on concepts of language translators.
- To develop skills in scanning, parsing, code generation, code optimization and type checking.
- To apply knowledge and skills of scanner and parser tools for developing a new translators.

Course Outcomes:

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

1. Gain knowledge on compiler, interpreter, patterns, tokens and regular expressions.
2. Acquire skills in scanning, parsing, code generation and code optimization to improve performance of a program in terms of speed and space.
3. Apply LEX and YACC tools to develop new scanners and parsers.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COMPILERS

Definition of compiler, interpreter and its differences, The phases of a compiler, Role of lexical analyzer, Regular expressions, Finite automata, From regular expressions to finite automata, Pass and phases of translation, bootstrapping, LEX-lexical analyzer generator.

UNIT-II: PARSING

Parsing, Role of parser, Context free grammar, Derivations, Parse trees, Ambiguity, Elimination of left recursion, Left factoring, Eliminating ambiguity from dangling-else grammar, Classes of parsing, Top-down parsing– Backtracking, Recursive-descent parsing, Predictive parsers, LL(1) grammars.

UNIT-III: BOTTOM-UP PARSING

Definition of bottom-up parsing, Handles, Handle pruning, Stack implementation of Shift-Reduce parsing, Conflicts during Shift-Reduce parsing, LR grammars, LR parsers-Simple LR, Canonical LR and Look Ahead LR parsers, Error recovery in parsing, Parsing ambiguous grammars, YACC-automatic parser generator.

UNIT-IV: SYNTAX-DIRECTED TRANSLATION

Syntax directed definition, Construction of syntax trees, S-attributed and L-attributed definitions, Translation schemes, Emitting a Translation.

Intermediate Code Generation: Intermediate forms of source programs– Abstract syntax tree, Polish notation and Three address code, Types of three address statements and its implementation, Syntax directed translation into three-address code, Translation of simple statements, Boolean expressions and flow-of-control statements.

UNIT-V: TYPE CHECKING

Definition of type checking, Type expressions, Type systems, Static and dynamic checking of types, Specification of a simple type checker, Equivalence of type expressions, Type conversions, Overloading of functions and operators.

UNIT-VI: RUN TIME ENVIRONMENTS

Source language issues, Storage organization, Storage-allocation strategies, Access to nonlocal names, Parameter passing, Symbol tables, Language facilities for dynamic storage allocation.

UNIT-VII: CODE OPTIMIZATION

Organization of code optimizer, Basic blocks and flow graphs, Optimization of basic blocks, The principal sources of optimization, The DAG representation of basic block, Global data flow analysis.

UNIT-VIII: CODE GENERATION

Machine dependent code generation, Object code forms, The target machine, A simple code generator, Register allocation and assignment, Peephole optimization.

TEXT BOOK:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, *Compilers–Principles, Techniques and Tools*, Low price edition, Pearson Education, 2004.

REFERENCE BOOKS:

1. Alfred V. Aho, Jeffrey D. Ullman, *Principles of compiler design,* Indian student edition, Pearson Education, 2001.
2. Kenneth C. Louden, Thomson, *Compiler Construction– Principles and Practice*, 1 ed, PWS Publishing, 1997.
3. K.L.P Mishra and N. Chandrashekaran, *Theory of computer science- Automata Languages and computation,* 2 ed, PHI, 2003.
5. Andrew W. Appel, *Modern Compiler Implementation C*, Cambridge University Press, 2004.

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SVEC-10 Regulations

IV B. Tech I-Semester

(10BT70502) SOFTWARE TESTING TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	--	--	4

PREREQUISITES: A Course on Object Oriented Software Engineering.

COURSE DESCRIPTION: Introduction and the Taxonomy of Bugs; Flow Graphs and Path Testing; Transaction-Flow Testing and Data-Flow Testing; Domain Testing; Paths, Path Products and Regular Expressions; Logic based Testing; States, State Graphs and Transition Testing; and an Overview of Software Testing Tools.

Course Objectives:

- To gain knowledge in concepts of software testing process, criteria, strategies and methodologies.
- To develop skills on software test automation and management using modern tools.
- To apply knowledge of testing to real time project implementation.

Course Outcomes:

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

1. Acquire knowledge in applied testing techniques of software at different levels such as
   - Path testing,
   - Dataflow testing,
   - Transaction flow testing,
   - Domain testing and
   - Logic base testing.
2. Develop testing skills for verification of functionality and validation of requirements to meet the client needs.
3. Identify and analyze hazards and skills for meeting the requirements of software.
4. Apply tools such as win runner, QTP for testing of software products.

DETAILED SYLLABUS

UNIT - I: INTRODUCTION AND THE TAXONOMY OF BUGS

Purpose of Testing, Some Dichotomies, A Model for Testing, The Consequences of Bugs, A Taxonomy for Bugs, Some Bug Statistics.

UNIT - II: FLOW GRAPHS AND PATH TESTING

Path-Testing Basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Implement and Application of Path Testing.

UNIT - III: TRANSACTION-FLOW TESTING AND DATA-FLOW TESTING
Transaction Flows, Transaction-Flow Testing Techniques, Dataflow Testing Basics, Data-Flow Testing Strategies, Application, Tools, Effectiveness.

UNIT - IV: DOMAIN TESTING

Domains and Paths, Nice & Ugly Domains, Domain Testing, Domains and Interfaces Testing, Domains and Testability.

UNIT - V: PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS

Path Products and Path Expressions, A Reduction Procedure, Applications, Regular Expressions and Flow-Anomaly Detection.

UNIT – VI: LOGIC BASED TESTING

Motivational Overview, Decision Tables, Path Expressions Again, KV Charts, Specifications.

UNIT - VII: STATES, STATE GRAPHS AND TRANSITION TESTING

State Graphs, Good State Graphs and Bad, State Testing, Testability Tips.

Graph Matrices and Applications: Motivational overview, The Matrix of a Graph, Relations, The Powers of a Matrix, Node-Reduction Algorithm, Building Tools.

UNIT VIII: AN OVERVIEW OF SOFTWARE TESTING TOOLS

Overview of Win Runner and QTP Testing Tools for Functional / Regression Testing, Testing an Application Using Win Runner and QTP, Synchronization of Test Cases, Data-Driven Testing, Testing a Web Application.

TEXT BOOKS:

1. Boris Beizer, *Software Testing Techniques*, 2 ed, Dreamtech Press, 2004.
2. Dr. K.V.K.K. Prasad, *Software Testing Tools*, Dreamtech Press, 2005.

REFERENCE BOOKS:

1. William E. Perry, *Effective methods of Software Testing*, 3 ed, John Wiley Edition.
2. Meyers*, Art of Software Testing*, 2 ed, John Wiley.

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IV B. Tech II-Semester

(10BT80502) HUMAN COMPUTER INTERACTION (ELECTIVE-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	--	4

PREREQUISITE: *Nil*

Course Description: Importence of user interface, graphical user interface, design process, screen designing, windows, components, software tools and interaction devices.

Course Objectives:

- To acquire knowledge in Graphical user interface Design principles, methods, windows, components, tools, relation between formal design methods and system usability and acceptance.
- To develop and design guidelines, models and methods to provide better computer systems and promote user-orientation.
- To apply the knowledge of Interface design Principles in analysis, design, and evaluation of computer systems.

Course Outcomes:

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

CO1. Gain knowledge in

- The Graphical User Interface and Design Process
- Screen Designing and Windows Components
- Software Tools and Interaction Devices

1. Develop design using modern tools, usability and experimental testing, and evaluation of human computer interaction systems.
2. Communicate effectively with peers and experts about requirements, design, and evaluation activities relating to Human Computer Interaction.
3. Design, Develop and Implement an interface work either individually or in Teams

DETAILED SYLLABUS:

UNIT I: INTRODUCTION

Importance of user Interface – definition, importance and benefits of good design, a brief history of Screen design.

UNIT II: THE GRAPHICAL USER INTERFACE

Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user interface-popularity, characteristics, Principles of user interface design.

UNIT III: DESIGN PROCESS

Human interaction with computers, importance of human characteristics, human consideration in design, Human interaction speeds, Understanding business functions.

UNIT IV: SCREEN DESIGNING

Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V: WINDOWS

System menus and Navigation schemes, selection of window, selection of devices based controls and screen based controls, organize and layout windows and web pages, Touch screen and surface computing.

UNIT VI: COMPONENTS

Text and messages, Icons and images, Multimedia.

Colours - uses, problems with colours, choosing colours.

UNIT VII: SOFTWARE TOOLS

Specification methods-Grammars, Menu-Selection and Dialog-box trees, Transition diagrams, State charts, Interface Building Tools-Interface mockup tools, Software-engineering tools.

UNIT VIII: INTERACTION DEVICES

Keyboard and function keys – pointing devices – speech recognition, digitization and generation, image and video displays.

TEXT BOOKS:

1. Wilbert O Galitz, *The Essential Guide to user Interface Design*, 2 ed, Wiley India Education.
2. Ben Shneidermann, *Designing the user interface*, 3 ed, Pearson Education Asia.

REFERENCE BOOKS:

1. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Rssell Bealg, *Human Computer Interaction*, 3 ed, Pearson, 2004.
2. Preece, Rodgers, Sharps, *Interaction Design*, 3 ed, Wiley Dreamtech, 2011.
3. Soren Lauesen, *User Interface Design*, Pearson Education, 2005.

IV B. Tech II-Semester

(10BT80504) CLOUD COMPUTING
(ELECTIVE-IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	--	4

PRE-REQUISITES: A Course on Distributed Computing, Operating Systems and Computer Networks

COURSE DESCRIPTION: Introduction to cloud computing; Cloud computing architecture; Introduction to virtualization; Virtualization technologies; Security; Disaster recovery; Graph reduction; Graph reduction and Graph theory.

Course Objectives:

- To provide the knowledge on Cloud Computing Characteristics, Protocols, Deployment Models and Services.
- To acquire skills in Virtualization Technologies to develop cloud based Applications.
- To apply Cloud Computing Tools to solve the real time applications.

Course Outcomes:

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

1. Gain the knowledge on Cloud Computing Characteristics, Protocols, Deployment Models and Services, Cloud Security, Cloud Disaster Recovery and Graph Reduction.
2. Design and deploy cloud based applications using various Virtualization Technologies such as VMware, Hyper-V, Xen and Virtual Iron.
3. Apply MS-Azure, Google App Engine, Hadoop and OBIEE Tools for solving real time applications.

DETAILED SYLLABUS:

UNIT- I: INTRODUCTION TO CLOUD COMPUTING

The History and Future of Cloud, Cloud Computing Basics, Overview of Cloud Computing-Components, Infrastructure and Services, Usage of Cloud Computing, Benefits and Limitations, Cloud Infrastructure Models, Cloud computing protocols and On-Demand services.

UNIT- II: CLOUD COMPUTING ARCHITECTURE

Requirements, Introduction to Cloud Computing Architecture, various kinds of Cloud Computing Architecture, Grid Computing, Transactional Computing, On Demand Computing, Distributed Computing and Cloud Application Architectures.

UNIT- III: INTRODUCTION TO VIRTUALIZATION

History of virtualization, objectives of virtualization, benefits of virtualized technology, the virtual service desk, related forms of computing, virtualization processes.

UNIT- IV: VIRTUALIZATION TECHNOLOGIES

VMware, Microsoft Hyper-V, Virtual Iron, Xen, Ubuntu (Server Edition), Software Virtualization, Para Virtualization, OS Virtualization, Oracle Virtualization, Storage Virtualization Technologies, Virtualization and Storage Management.

UNIT- V: SECURITY

Security issues in Cloud Computing - Data Security, Network Security, and Host Security.

UNIT – VI: DISASTER RECOVERY

Disaster Recovery Planning, Disasters in the Cloud, Disaster Management. Scaling a Cloud Infrastructure- Capacity Planning, Cloud Scale.

UNIT – VII: GRAPH REDUCTION

Introduction, Types of Graphs, Examples, Representation and Application.

UNIT – VIII: CASE STUDIES

Google APP Engine, Yahoo Hadoop, OBIEE and Windows Azure.

TEXT BOOKS:

1. George Reese, *Cloud Application Architectures Building Applications and Infrastructure in the Cloud*, O'Reilly Media Released, April 2009.
2. Ivanka Menken and Gerard Blokdijk, *Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book*, Emereo Pvt Ltd, April 2009.

REFERENCE BOOKS:

1. Rajkumar Buyya, James Broberg and Andrzej Goscinski, *Cloud computing principles and Paradigms*, John Wiley and sons, 2011.
2. Michael Miller, *Cloud Computing*, 1 ed, Dorling Kindersley India, 2009
3. Danielle Ruest, *Virtualization: A Beginner's Guide*, 1 ed, MHE, 2009
4. Barrie Sosinsky, *Cloud Computing bible*, Wiley India Pvt Ltd, 2011.

III - B.TECH I - SEMESTER

10BT51001: PROCESS CONTROL INSTRUMENTATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Control Systems, Transducers in Instrumentation

COURSE DESCRIPTION:

Mathematical modeling of processes ;Different types of controllers; characteristics of controllers; design of controllers; Tuning of controllers; characteristics of control valves ; multi loop controllers and case studies .

COURSE OUTCOMES: At the end of the course students will be able to:

1. Demonstrate knowledge about:
    - Mathematical modeling of different process.
    - Tuning of controllers for different process
    - Selection of control valves for different operations
    - Different unit operations
    - Multi loop control

2. Design and analyze the response of controllers for different process.

DETAILED SYLLABUS :

UNIT I
Introduction to Process Control: Definitions, elements of process control, process variables, degree of freedom, characteristics of liquid system, gas system and thermal system. Mathematical model of liquid process, gas process, thermal process. Batch process and continuous process, self regulation.

UNIT II
Basic Control Actions: Characteristics of ON-OFF, proportional, integral, derivative control modes, composite control modes, PD, PI and PID modes, two position control, single speed floating control.

UNIT III
Controlling Elements: Self operated controllers, pneumatic proportional controllers (displacement and force type), air supply for pneumatic systems, hydraulic controllers, electrical proportional controllers, electronic proportional controllers, theory of automatic controllers circuits.

UNIT IV
Controller Tuning: Evaluation criteria: 1/4th decay ratio, IEA, ISE, ITAE. Determination of optimum settings for mathematically described process using time response and frequency response.
Tuning Methods: Process curve reaction method, continuous oscillation method, damped oscillation method.

UNIT V
Final Control Elements: I/P converter, P/I converter. Pneumatic, electric and hydraulic actuators. Valve positioner

UNIT VI
Control Valves: Characteristics of control valves, valve body, valve types: globe, butterfly, diaphragm, ball valves. Control valve sizing, cavitations, flashing.

UNIT VII
Control Systems With Multiple Loops: Cascade control, feed forward control, ratio control, selective control systems, split range control, adaptive and inferential control

UNIT VIII
Selected Unit Operations: Mixing, evaporation, drying, heat exchanger, distillation process. Case study of control schemes of binary distillation column.

TEXT BOOKS:

1. Donald P. Eckman, *Automatic Process Control,* Wiley Eastern Ltd., New Delhi, 1993
2. G.Stephanopoulis, *Chemical Process Control,* PHI, 1990.

REFERENCES:

1. Curtis D. Johnson, *Process Control Instrumentation Technology,* 7th Edition, Pearson Education, New Delhi, 2002.
2. F.G Shirskey, *Process Control Systems*, Mc Graw Hill Company
3. Patranabis, *Principles of Process Control*, TMH, 1981
4. Peter Harriot, *Process Control*, TMH

III - B.TECH I - SEMESTER

10BT51002: **INDUSTRIAL INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITE:

Transducers in Instrumentation, Electrical and Electronic Measurements, Thermodynamics & Fluid Mechanics, Principles of Electrical Engineering.

COURSE DESCRIPTION:

Science of measurement; measurement of parameters like velocity, acceleration, Torque, pressure, flow, viscosity, density, temperature, level, humidity, acceleration and sound.

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

1. Demonstrate knowledge on science of measurement and measurement techniques.
2. Identity and formulate instruments to measure Force, Torque, Weight
3. Design and develop solutions for measurement of industrial parameters like pressure, velocity and acceleration.

DETAILED SYLLABUS :

UNIT I
Metrology: Measurement of length, Plainness, Area, Diameter, Roughness, Angle, Comparators, Gauge blocks, Optical Methods of length & distance measurements.

UNIT II
Torque & Velocity Measurement: Measurement of torque using Strain gauge, Inductive principle, Digital methods and Magnetostrictive transducer. Measurement of velocity using Electromagnetic transducer, Moving magnet type, Moving coil type, Tachogenerator, Stroboscope.

UNIT III
Pressure Measurement: Basics of pressure measurement, Deadweight gauges & Manometer types, Vibrating cylinder transducers, High & Low pressure measurement, McLeod Gauge, Knudsen gauge, Momentum transfer gauges, Thermal conductivity gauges, Ionization gauges, Dual gauge techniques.

UNIT IV
Flow Measurement: Head type, Area type, Electromagnetic type, Positive displacement type, Mass flow meter, Ultrasonic type, Vertex Shedding type, Hotwire anemometer type, Laser doppler velocimeter.

UNIT V
Viscosity & Density Measurement: Viscosity: definition, units, Industrial viscometers, laboratory viscometers. Density: definition, units, Load cell method, Buoyancy method, Air pressure balance method, Gamma ray method, Vibrating probe method.

UNIT VI
Temperature Measurement: Temperature standards, fixed points, filled-system thermometers, Bimetallic thermometer, Thermocouple: Laws of thermocouple, Cold junction compensation. Measuring circuits, Speed of response, linearization, Resistance thermometer: 3 lead and 4 lead connections, thermistors, IC temperature sensors.

Radiation pyrometer, optical pyrometer. Installation, maintenance and calibration of thermometers and thermocouples.

UNIT VII

Level Measurement: Electrical methods, Resistance type, Capacitance type, Ultrasonic level gauging, float gauge, torque tube, bubbler tube, Slight glass, Displacer.

UNIT VIII

Other Measurements: Accelerometer of different types, Gyroscopes, Humidity, Sound level meter, Microphones.

TEXT BOOKS:

1. Doeblin, E.O., *Measurement Systems: Applications and Design,* 4th Edition, TMH, 2003
2. Patranabis D, *Principles of Industrial Instrumentation*, TMH, 1997

REFERENCES:

1. Considine D M, *Process Instruments & Control handbook*, 4th Edition, McGraw Hill International, 1993
2. RK Jain, *Mechanical & Industrial Measurements*, Khanna Publishers, 1986
3. Jones EB, *Instrument Technology*, Volume-I, Butterworths, 1981

III - B.TECH II - SEMESTER

10BT61001: OPTOELECTRONIC & LASER INSTRUMENTATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Engineering Physics, Industrial Instrumentation

COURSE DESCRIPTION:

Different types of optical fibre; components of optical fibre; fibre optic sensors; properties and types of LASER; Industrial and biomedical applications of LASER.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Demonstrate about:
    - types of optical fibre, components of optical fibre.
    - Measurement of temperature, pressure, strain using fibre optic sensors and LASER.
2. Analyze losses in optical fibre.

DETAILED SYLLABUS :

UNIT I
Optical Fibers: Introduction to optical fibers, Laws of reflection, critical angle, Light guidance, Numerical aperture, Dispersion, Losses, Different types of fibers, Modes of operation and their properties transmission characteristics.

UNIT II
Components of Optical Fiber: Light Sources for fiber optics, Photo detectors, source coupling, Fiber termination, Splicing and connectors.

UNIT III
Fiber Optic Sensors: Fiber optic instrumentation system, Interferometer method of measurement of length, Moire fringes, Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain, fiber optic Gyroscope, Polarization maintaining fibers, Applications.

UNIT IV
Laser Fundamentals: Fundamental characteristics of lasers, Three level and four level lasers, Properties of laser, Laser modes, Resonator configuration, Q-switching and mode locking, Cavity damping, Types of lasers, Gas lasers, solid lasers, liquid lasers, semiconductor lasers.

UNIT V
Laser Instrumentation: Industrial applications of lasers, Laser heating Material processing, Laser welding, melting and trimming of material, Laser Doppler velocity meter

UNIT VI
Medical Applications: Lasers and tissue interaction, Laser instruments for surgery, removal tumors of vocal cords, plastic surgery, dermatology, gynecology and oncology.

UNIT VII
Holography: Principle, Methods, Holographic Interferometers, Holography for non-destructive testing, Holographic components, and applications

UNIT VIII
Optoelectronic Modulators: Electro-optic, Magneto-optic and Acousto-optic Modulators

TEXT BOOKS:

1. Das P., *Lasers and Optical Engineering*, Springers International Students Edition, 1991.
2. A.K. Ghatak, *Optics,* 2nd Edition, TMH, 1992.

REFERENCES:

1. Ghatak A.K. and Thyagarajan K., *Optical Electronics*, Foundation Books, 1991
2. Thyagarajan K. and Ghatak A.K., *Lasers: Theory and Applications*, Plenum Press, 1981.
3. Gerd Keiser, *Optical fiber communication*, 3rd Edition, TMH, 2000.

III - B.TECH II - SEMESTER

10BT61002: **BIOMEDICAL INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Fundamentals of Sensors and Transducers.

COURSE DESCRIPTION:

Human Anatomy & Physiology; Bio-signals; Cardiovascular and Neuro-muscular Instrumentation; Therapeutic Equipment; Advanced Imaging techniques.

COURSEOUTCOMES: On successful completion of the course the students will be able to

1. Demonstrate knowledge on human anotomy and physiology, ECE, EMG and EEG measuring systems, Medical imaging and therapeutic equipment.

2. Analyze the performance of Bio-signals

DETAILED SYLLABUS :

UNIT I
Components of medical instrumentation system, static and dynamic characteristics of medical instruments, biosignals and characteristics, bioamplifier. Problems encountered with measurements from human beings.

UNIT II
Electro Physiology: Review of Physiology and anatomy. Structure of cell, sources of bioelectric potentials, resting and action potentials, propagation of action potentials, conduction through nerve to neuromuscular junction.

UNIT III
Electrode Theory: Electrode-electrolyte interface, electrode-electrolyte skin interface, motion artifacts, external and internal electrodes, bio chemical electrodes, transducers for bio medical applications.

UNIT IV
Cardiovascular Instrumentation: Physiology of cardiovascular system, electrical conduction system of the heart, interpretation of ECG waveform, standard 12-lead configurations, Einthoven triangle, specifications of ECG Machine. Blood pressure, blood flow and heart sound measurements. Relation between electrical and mechanical activities of the heart.

UNIT V
Neuro-Muscular Instrumentation: Physiology of nervous system, electrode placement for EEG and EMG recording. Specification of EEG and EMG machines Interpretation of EEG and EMG.

UNIT VI
Therapeutic Equipment: Pacemaker, Defibrillator, cardio vector, Diathermy: Shortwave and microwave. Hemodialysis machine.

UNIT VII
Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT VIII

Medical Imaging System: Radiography, computed radiography, computed tomography, magnetic resonance imaging, ultrasonography

TEXT BOOKS:

1. Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, *Biomedical Instrumentation and Measurements,* 2^{nd} Edition, PHI, 2009
2. John G. Webster, *Medical Instrumentation, Application and Design*, John Wiley, 2007

REFERENCES:

1. R.S. Khandpur, *Hand-book of Biomedical Instrumentation*, 2^{nd} Edition, TMH, 2007

IV - B.Tech I – Semester

10BT71001: **ANALYTICAL INSTRUMENTATION**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Industrial instrumentation, Transducers in Instrumentation

COURSE DESCRIPTION:
Gas analyzers; spectrometers; nuclear radiation detectors; Dissolved component analyzers; Analysis of structure of different chemical components.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Demonstrate knowledge in:
    - Analyzing the characteristics of pH meters and dissolved oxygen analyzers.
    - Analyzing of different gas analyzers and radiation detectors.
    - Analyzing of different chromatography techniques.
    - Analyzing of different Spectrometers with different excitations.
2. Analyze complex engineering problems critically in the area of analytical instruments and chemical component analysis.
3. Apply contextual knowledge to the structural and functional analysis of chemical components.

DETAILED SYLLABUS :

UNIT I
pH and Conductivity & Dissolved Component Analyzer: Conductivity meters, pH meters, dissolved oxygen analyzer, hydrogen analyzer, sodium analyzer, silica analyzer and sampling systems.

UNIT II
Gas Analyzers: Thermal conductivity types, CO monitor, NO_X analyzer, H_2S analyzer system and sampling, industrial analyzer circuits, analysis based on ionization of gases, sulphur dioxide, hydro carbons estimation.

UNIT III
Chromatography: Introduction, basic definitions. Gas chromatography: Principle, detection systems and applications, Liquid chromatography: Principle, types, detection system, and applications.

UNIT IV
Oxygen Analyzer: Principles of oxygen analyzer, paramagnetic type, magnetic wind type, medical oxygen analyzer, detectors, sampling system.

UNIT V
Spectrophotometers – I: Special methods of analysis, Beer-Lambert law, colorimeters, UV-VIS spectrophotometers, single and double beam instruments, sources and detectors. IR spectrophotometers and their types.

UNIT VI

Spectrophotometers – II: FTIR spectrophotometer, flame emission and atomic absorption spectrophotometer, atomic emission spectrophotometer, flame photometers, calorific value measurements.

UNIT VII

Principle of Nuclear Magnetic Resonance: Instrumentation associated with NMR spectrometer, introduction to mass spectrometer, electron spin resonance principle, X-ray spectrometer principle, X-ray detectors, X-ray diffractometers.

UNIT VIII

Applications: Nuclear radiation detectors, ionization chamber, GM counter, proportional counter, solid state detectors, gamma detector.

TEXT BOOKS:

1. Khandpur, *Handbook of Analytical Instruments,* TMH
2. Jain R.K., *Mechanical and Industrial Measurements*, 2nd Edition, Khanna Publishing, New Delhi, 1992

REFERENCES:

1. Willard H.H., Merrit L.L., Dean J.A.. and Seattle F.L., *Instrumental Methods of Analysis*, 6th Edition, CBS Publishing and Distributors, 1995
2. Skoog D.A. and West D.M., *Principles of Instrumental Analysis*, Holt Sounder Publication, Philadelphia, 1985

IV - B.Tech I – Semester

10BT71002: **AUTOMATION OF INDUSTRIAL PROCESS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITE: Control Systems, Signals and Systems, Process control instrumentation

COURSE DESCRIPTION:

Various Data Networks; advanced control strategies used in industries; design of digital controller; exposure to PLCs and DCS Integration with PLCs.

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

1. Demonstrate knowledge on
   - Types of Processes and Architecture of Computer Control Systems.
   - Process control requirements of computers
   - Process related variables and Computer Networks.
2. Develop skills in
   - Design of Control systems
   - Controller tuning methods
   - Design of controllers using various algorithms
3. Use PLC and DCS to automate the given process.

DETAILED SYLLABUS :

UNIT I
Introduction to Computer Control: Role of computers in the control of Industrial processes (plants). Elements of Computer Controlled Process / Plant. Classification, Batch Process, Types of Batch process, Continuous, Supervisory and Direct Digital Controls. Architecture, Centralized, Distributed and Hierarchical Systems. Man Machine or Human Computer Interface (HCI).

UNIT II
Building Blocks: Process Control Requirements of Computers. Process related variables. Computer Network, Communications in Distributed control Systems. Smart Sensors and Field bus.

UNIT III
Control System Design –I: Control System Design using heuristics and models. Controller Design – Regulator design and other design considerations. Controller Tuning – P, PI, PID, and Ziegler-Nicholas method.

UNIT IV
Control System Design –II: Computer control loop, Modified Z – Transform, Zero-order hold equivalence, First order system with time delay, Converting continuous time controller to discrete time domain, Design of controllers based on discrete time model – Deadbeat and Dahlin's algorithms.

UNIT V

Design of Feed Forward Controller: Block Diagram, Feed Forward control algorithms – dynamic, static, Deadbeat.

UNIT VI

Advanced Strategies: Cascade Control- Dynamic response, Types, Implementation, Predictive Control – Model based and Multivariable System, Statistical Process Control. Algorithms for Processes with Dead Time – Smith Predictor (SP), Analytical Predictor (AP).

UNIT VII

Programmable Logic Controllers: Architecture, Basic PLC Programming, Creating Ladder diagrams for Digital Logic gates, Timer/counter functions. Skip and MCR functions, Sequencer functions, Networking of PLCs.

UNIT VIII

Distributed Control System: Overview of Distributed Control System (DCS). DCS Software configuration, DCS Communication, DCS Supervisory Computer tasks, DCS Integration with PLCs and Computers.

TEXT BOOKS:

1. S.K.Singh, *Computer Aided Process Control,* PHI, 2009.
2. M.Chidambaram, *Computer Control of Processes,* 2nd Edition, Narosa Publications, 2003

REFERENCES:

1. Krishna Kanth. *Computer-based Industrial Control*, PHI, 1997
2. S.Bennett, *Real Time Control: An Introduction,* 2nd Edition, Pearson Education, 2003.
3. John W.Webb and Ronald A.Reis, *Programmable Logic Controllers-Principles and Applications*, 5th Edition, Pearson Education.

IV - B.Tech I – Semester

10BT71005: MEMS AND MICRO SYSTEMS

(ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: Basic knowledge in Physics, Sensors and Transducers.

COURSE DESCRIPTION:

The course gives the overview of MEMS, working principles of micro sensors and micro actuators, scaling laws that are used in the conceptual design of micro devices, materials used, micro fabrication processes for micro manufacturing and packaging of Microsystems.

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

1. Demonstrate knowledge on MEMS and Microsystems.
2. Identify the suitable materials, fabrication techniques, packaging methodologies to develop MEMS devices.
3. Design and develop various micro sensors and micro actuators that meet desired specifications and requirements.
4. Use advanced techniques to design microstructures that find applications in the field of biomedical, automobile and in communication engineering.

DETAILED SYLLABUS :

UNIT I
Overview of MEMS & Microsystems: Basics of MEMS & microsystems, products, evolution of microfabrication, microsystems & microelectronics, miniaturization, microsystem design & manufacture, applications.

UNIT II
Working Principles of Microsystems: Introduction, microsensors, microactuation, MEMS with microactuators, microaccelerometers, microfluidics.

UNIT III
Engineering Mechanics for Microsystems Design: Introduction, static bending of thin plates, mechanical vibration, thermomechanics, fracture mechanics.

UNIT IV
Scaling Laws in Miniaturization: Introduction to scaling, scaling in geometry, rigid body dynamics, electrostatic forces, electromagnetic forces, fluid mechanics, electricity, heat transfer.

UNIT V
Materials For MEMS & Microsystems: Substrates & wafers, active substrate materials, silicon as a substrate material, silicon compounds, silicon piezoresistors, gallium arsenide, quartz, piezoelectric crystals, polymers, packaging materials.

UNIT VI

Microsystem Fabrication Processes: Photolithography, ion implantation, diffusion, oxidation, chemical vapor deposition, physical vapor deposition, deposition by epitaxy, etching.

UNIT VII

Overview of Micromanufacturing & Microsystems Design: Bulk micromanufacturing, surface micromanufacturing, LIGA process, design consideration, process design, mechanical design.

UNIT VIII

Microsystems Packaging: Overview of mechanical packaging of microelectronics, Microsystem packaging, essential packaging technologies, three-dimensional packaging, signal mapping and transduction, design case: Pressure sensor packaging.

TEXT BOOKS:

1. HSU, TAI RAN *MEMS and Microsystems Design and Manufacture*, TMH, 2002

REFERENCES:

1. Rai-Choudhury, *MEMS and MOEMS Technology and Applications,* PHI

IV - B.Tech II – Semester

10BT81001: INDUSTRIAL ELECTRONICS

(Common to EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: Semiconductor Devices and Circuits, Electronic Circuit Analysis.

COURSE DESCRIPTION:

DC amplifiers and their importance; Design of regulated power supplies; SCRs and their applications in power control; Computer numeric control; timers used in industries, types of welding, electric heating and ultrasonic generation and its applications.

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

1. Demonstrate knowledge on the importance and need for DC amplifiers and its applications, Silicon controlled rectifiers and their application in power control, types of industrial timers, electric welding, electric heating, ultrasonic generation and applications. (PO1)

2. Design Regulated power supplies that meet desired specifications.

3. Use modern tools like CNCs to provide effective solution for electronics and instrumentation problems.

DETAILED SYLLABUS :

UNIT I
Amplifiers: Need for DC amplifiers, DC amplifiers, drift, causes, compensation techniques, darlington emitter follower, cascade amplifier, stabilization, chopper stabilization.

UNIT II
Regulated Power Supplies: Design of series and shunt voltage regulators, protection techniques, switching mode voltage regulators, servo voltage stabilizer, monolithic voltage regulators.

UNIT III
Silicon Controlled Rectifier: Principle of operation, characteristics of SCR, methods of turn on and turn off mechanism, gate characteristics, triggering modes of SCR – R, RL, RC.

UNIT IV
Applications of SCR in Power Control: Static circuit breaker, protection of SCR, inverters, classification, single phase inverters, converters, single phase half wave and full wave

UNIT V
DIAC, TRIAC and SCR Applications: Chopper circuits, principle, methods and configurations, Cyclo Converters, Single phase and Three phase, DIAC, TRIAC.

UNIT VI
Numeric Control: Basic concept of numerical control, driving devices, hydraulic systems, DC motors, stepping motors, data processing unit characteristics of N/C system, CNC / DNC – CNC typical system, block diagram, interfacing of CNC Machines, adaptive control systems.

UNIT VII

Industrial Applications – I: Industrial Timers, classification, types, electronic timers, classification, RC and digital timers, time base generators, electric welding, classification, types and methods of resistance and ARC welding.

UNIT VIII

Industrial Applications – II: High frequency heating, principle, merits, applications, high frequency source for induction heating, dielectric heating, principle, material properties, electrodes and their coupling to RF generator, thermal losses and applications, ultrasonics, generation and applications.

TEXT BOOKS:

1. G K Mithal and Dr Maneesh Gupta*, Industrial and Power Electronics,* 19th Edition*,* Khanna Publications*,* 2003*.*
2. Yoram Korean and Joseph Ben*, Numerical Control of Machine tools,* Khanna Publishers, New Delhi, 1998.

REFERENCES:

1. D Roy Chowduary*, Linear Integrated Circuits*, 2nd Edition, New age International (p) Ltd, 2003.

II B.Tech - I Semester

14BT31201: DISCRETE MATHEMATICAL STRUCTURES

(Common to CSE,CSSE&IT)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Engineering Mathematics".

COURSE DESCRIPTION: Mathematical Logic; Predicates; Relations; Algebra Structures; Mathematical Reasoning; Recurrence Relations; Graphs; Graph Theory and its applications.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

CO1. Demonstrate knowledge on mathematical logic, algebraic structures, relations, recurrence relations and mathematical reasoning.

CO2. Analyze and prove given statement by contradiction and automatic theorem.

CO3. Design network applications using Prim's and Kruskal's algorithms.

CO4. Apply the concepts of graph theory, permutation, combinations, counting principle and graph theory in solving real-time problems.

DETAILED SYLLABUS

UNIT-I: MATHEMATICAL LOGIC AND PREDICATES (11 periods)

MATHEMATICAL LOGIC: Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

PREDICATES: Predicate Calculus, Free and Bound variables, Rules of inference, Consistency, Proof of contradiction and Automatic Theorem Proving.

UNIT-II: FUNCTIONS AND RELATIONS (9 periods)

RELATIONS: Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications.

FUNCTIONS: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-III: ALGEBRAIC STRUCTURES (6 periods)

Algebraic System: Examples and General Properties SemiGroups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT-IV: MATHEMATICAL REASONING AND RECURRENCE RELATIONS (10 periods)

MATHEMATICAL REASONING: Methods of Proof, Mathematical Induction, Basics of counting, The Inclusion- Exclusion Principle, The Pigeon hole principle, Permutations and Combinations, Generalized Permutations and Combinations.

RECURRENCE RELATIONS: Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT-V: GRAPH THEORY AND ITS APPLICATION (9 periods)

Graphs: Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring.

Trees: Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm and Prim's Algorithm.

(Total:45 Periods)

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, 2001.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill, 6th edition, 2007.

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India Private Limited, 2nd edition, 2004.
2. Ralph P. Grimaldi and B.V.Ramana, "Discrete and Combinatorial Mathematics- an Applied Introduction", Pearson Education, 5th edition, 2006.

II B.Tech - II Semester
14BT41201: OBJECT ORIENTED PROGRAMMING
(COMMON TO CSE,CSSE & IT)

Int. Marks: 30 ; Ext. Marks: 70 ; Total Marks: 100

L	T	P	C
3	1	-	3

PREREQUISITES: A course on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Object Oriented Concepts; Basics of Java; Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling, Applets, AWT, Database Connectivity and Servlets.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to:

CO1. Demonstrate Knowledge on:
- Object Oriented Programming concepts - classes, objects, inheritance, polymorphism, encapsulation and abstraction.
- Packages, interfaces, multithreading, exception handling, event handling.

CO2. Apply AWT and Applets to design and develop interactive Graphical User Interfaces.

CO3. Gain problem solving skills to provide effective solutions for real world problems.

DETAILED SYLLABUS:

UNIT-I: (9 Periods)
OBJECT ORIENTED THINKING: Need for OOP paradigm, OOP concepts
History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.
classes and objects: concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-II: INHERITANCE, PACKAGES AND INTERFACES
(9 Periods)

Understanding Inheritance: Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, using super, Creating multi-level hierarchy, method overriding, abstract classes, using final with inheritance.

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Interfaces: Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III: EXCEPTION HANDLING AND MULTITHREADING
(9 Periods)

Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Java thread model, thread life cycle, creating threads, thread priority, synchronizing threads, inter thread communication.

UNIT-IV: APPLETS, EVENT HANDLING AND AWT
(9 Periods)

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT-V: JDBC and SERVLETS **(Periods:09)**

Database Connectivity: Loading the driver, Establishing connection, Create statement, Execute query, Iterate result set, Scrollable Results, and Transactions.

Servlets: The Life Cycle of a Servlet, Using Tomcat for Servlet Development, Create and Compile the Servlet Source Code, Start Tomcat, Start a Web Browser and Request the Servlet, The Servlet API, The Javax.Servlet Package, The javax.Servlet.http Package.

(Total Periods: 45)

TEXT BOOKS:

1. Herbert Schildt, "Java the complete reference," TMH, 7th edition, 2007.
2. Timothy Budd, "Understanding Object-oriented Programming with Java", Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, "Programming in java," Oxford university press, 2nd edition, 2014.

III B. Tech. I - Semester

10BT51201: SOFTWARE ENGINEERING

(Common to IT and CSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Fundamental concepts of software engineering, software process models: conventional and agile process models, software requirements engineering process, system analysis and design, user interface design and reengineering, software testing and metrics, risk and quality management.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain Knowledge on:
   - Fundamental concepts of software engineering
   - Process models.
   - Software development life cycle including requirements modeling, design, testing, metrics, risk and quality management.
2. Analyze the requirements engineering process, choose suitable models and risk analysis to develop effective software project.
3. Design and develop quality software product using appropriate testing techniques and process metrics.

UNIT-I: INTRODUCTION TO SOFTWARE ENGINEERING

The evolving role of software, Changing Nature of Software, Software myths.

A Generic View of Process: Software engineering - A layered technology, a process framework, Process patterns, process assessment, personal and team process models.

UNIT-II: PROCESS MODELS

The Waterfall model, Incremental model, RAD model, Prototyping, Spiral model, Concurrent Development model, The Unified process, Agile process models.

Software Requirements: Functional and Non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT-III: REQUIREMENTS ENGINEERING PROCESSES

Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System Models: Context models, Behavioral models, Data models, Object models, Structured methods.

UNIT-IV: DESIGN ENGINEERING

Design process and Design quality, Design concepts, the design model.

Creating an Architectural Design: Software Architecture, Data design, Architectural styles and patterns, Architectural Design.

UNIT-V: USER INTERFACE DESIGN AND RE-ENGINEERING

Performing User Interface Design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

Re-Engineering**:** Reverse Engineering, Restructuring, Forward Engineering.

UNIT-VI: SOFTWARE TESTING

A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, System testing, the art of Debugging.

UNIT-VII: SOFTWARE METRICS

Product Metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Size Oriented Metrics, Function-Oriented Metrics, Reconciling LOC and FP Metrics, Object-Oriented Metrics, Use-Case Oriented Metrics, Web Engineering Project Metrics, Metrics for Software Quality.

UNIT-VIII: RISK AND QUALITY MANAGEMENT

Risk Management: Reactive vs. Proactive Risk strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation Monitoring and Management (RMMM), RMMM Plan.

Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Statistical Software Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, The Capability Maturity Model Integration (CMMI).

TEXT BOOKS:

1. Roger S. Pressman, *Software Engineering, A practitioner's Approach,* 6th edition, McGrawHill International Edition, 2005.
2. Sommerville, *Software Engineering,* 7th edition, Pearson Education, 2006.

REFERENCE BOOKS:

1. K. K. Agarwal & Yogesh Singh, *Software Engineering,* 3rd edition, New Age International Publishers, 2007.
2. James F. Peters, Witold Pedrycz, John Wiely, *Software Engineering,* an Engineering approach, 2000.
3. Shely Cashman Rosenblatt, *Systems Analysis and Design,* 6th edition, Thomson Publications, 2006.

III B. Tech. I Semester

10BT51202: COMPUTER GRAPHICS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: Courses on "Engineering drawing", "Problem solving and computer programming".

COURSE DESCRIPTION: Introduction to Computer Graphics; Output Primitives; 2-D Geometrical Transforms; 2-D Viewing; 3-D Object Representation; 3-D Geometric Transformations; Visible Surface Detection Methods; Computer Animation.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge in various graphical interactive devices and computer animation.
2. Write algorithms to generate points and lines in uni-dimensional systems and techniques like viewing and transformation for 2-D objectives.
3. Create 3-D objects by modeling techniques.
4. Comprehend various image surface detection methods.

UNIT-I: INTRODUCTION TO COMPUTER GRAPHICS

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

UNIT-II: OUTPUT PRIMITIVES

Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-III: 2-D GEOMETRICAL TRANSFORMS

Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

UNIT-IV: 2-D VIEWING

The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT-V: 3-D OBJECT REPRESENTATION

Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-VI: 3-D GEOMETRIC TRANSFORMATIONS

Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-VII: VISIBLE SURFACE DETECTION METHODS

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

UNIT-VIII: COMPUTER ANIMATION

Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

Image Manipulation and Storage: Digital image file formats, Image compression standard - JPEG.

TEXT BOOKS:

1. Donald Hearn and M.Pauline Baker, Computer Graphics C version, Pearson Education, 2006.
2. Foley, VanDam, Feiner and Hughes, Computer Graphics Principles and practice in C, Pearson Education, 2nd edition, 1996.

REFERENCE BOOKS:

1. Steven Harrington, *Computer Graphics,* TMH, 1982.
2. Neuman and Sproul, *Principles of Interactive Computer Graphics,* TMH, 2005.
3. David F Rogers, *Procedural elements for Computer Graphics,* 2nd edition, Tata Mc-Graw hill, 2001.
4. Zhigand xiang, Roy Plastock, Schaum's outlines, *Computer Graphics,* 2nd edition, Tata Mc-Graw hill edition, 2004.

III B. Tech. II Semester

10BT61201: **OBJECT ORIENTED ANALYSIS AND DESIGN**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: Courses on "Object oriented Programming" and "Software Engineering".

COURSE DESCRIPTION: Object-oriented design, Features and problems of complex systems, object-oriented modeling, object-oriented design methodologies, methodology notation (elements of UML or any other selected notation, class and object diagrams, interaction diagrams, state transition diagrams, process and module diagrams, etc.), applications and case studies, CASE tools.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

Gain knowledge in

1. Analyze various case studies for real time problems with the help of Unified Modeling Language.
2. Develop and Design solutions to handle complex problems through various UML models.
3. Apply forward and reverse engineering techniques for effective integration in software development process.

UNIT-I: INTRODUCTION TO UML

Introduction to object oriented concepts like inheritance, polymorphism, information hiding, Importance of modeling, principles of modeling, object oriented modeling, An overview of UML, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT-II: BASIC STRUCTURAL MODELING

Classes-Terms and concepts, Common modeling techniques, Relationships-modeling simple dependencies, single Inheritance and structural relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Instances.

UNIT-III: CLASS AND OBJECT DIAGRAMS

Terms, concepts, modeling techniques for Class Diagram-modeling Simple collaboration, Logical database Schema Forward and Reverse Engineering, Object Diagrams-Modeling object structures, Forward and reverse engineering.

UNIT-IV: BASIC BEHAVIORAL MODELING-I

Interactions-Terms and concepts, modeling a flow of control, Interaction diagrams-terms and concepts, modeling flows of control by time ordering and control by organization, Forward and reverse Engineering.

UNIT-V: BASIC BEHAVIORAL MODELING-II

Use cases-terms and concepts, modeling the behavior of the element, Usecase Diagrams-Terms and concepts, modeling the context of a system and requirement of a system, Forward and reverse Engineering, Activity Diagrams - Terms and concepts, modeling a workflow and an operation, Forward and reverse Engineering.

UNIT-VI: ADVANCED BEHAVIORAL MODELING

Events and signals-modeling a family of signals and exceptions, state machines-modeling the lifetime of an object, state machines, processes and Threads-modeling multiple flows of control and interprocess communication, time and space-modeling timing constraints, distribution of objects and objects that migrate, state chart diagrams-modeling reactive objects and Forward and reverse Engineering.

UNIT-VII: ARCHITECTURAL MODELING

Component-Terms and concepts, modeling executables and Libraries, modeling tables, file, and documents, modeling an API, modeling source code, Deployment-modeling processors and devices, modeling the distribution of components, Component diagrams-modeling source code, executable release, physical database, Adaptable Systems, Forward and reverse Engineering and Deployment diagrams-modeling an embedded systems, Client/server System, Fully distributed systems, Forward and reverse Engineering.

UNIT-VIII: CASE STUDIES

Model all the views of: Automation of a Library, Point of Sales System.

TEXT BOOK:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, *The Unified Modeling Language User Guide,* 2nd edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, *UML 2 Toolkit,* WILEY-Dreamtech India Pvt. Ltd., 2006
2. Meilir Page-Jones, *Fundamentals of Object Oriented Design in UML,* Pearson Education,2000.
3. Pascal Roques, *Modeling Software Systems Using UML2,* WILEY-Dreamtech India Pvt. Ltd, 2004.
4. Craig Larman, *An introduction to Object - Oriented Analysis and Design and Unified Process Appling UML and Patterns,* Pearson Education, 2001.
5. John W. Satzinger, Robert B Jackson and Stephen D Burd, *Object-Oriented Analysis and Design with the Unified Process,* Cengage Learning, 2004.
6. R. C. Lee, and W. M. Tepfenhart, *UML and C++,* PHI, 2009.

III B. Tech. II Semester

10BT61202: **COMPUTER NETWORKS**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Data Communication".

COURSE DESCRIPTION: Introduction to computer networks; OSI, TCP/IP reference models-Layered architecture; Data link layer Protocols, Network Routing algorithms; Congestion control; Principles of Network Security, Computer Network applications.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquire knowledge on network topologies and network reference models. (PO1)
2. Analyze and implement error detection and channel allocation schemes. (PO2)
3. Gain skills for solving the problems related to routing and connection management. (PO4)
4. Understanding modern network applications in social contexts and interfacing of computers. (PO5)

UNIT-I: INTRODUCTION

Network Applications, Network Hardware, Network Software, Reference Models: OSI, TCP/IP, Example Networks: Novell Network, X.25, Internet.

UNIT-II: THE PHYSICAL LAYER

Theoretical Basis for communication, Guided Transmission media, Wireless Transmission, The public switched telephone Networks, Mobile telephone system.

UNIT-III: THE DATA LINK LAYER

Design Issues, Error detection and correction-CRC, Hamming codes, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols: HDLC, The Data Link Layer in the Internet.

UNIT-IV: THE MEDIUM ACCESS SUBLAYER

Channel Allocation problem, Multiple Access protocols: ALOHA, CSMA, CSMA/CD protocols, Collision free protocol, Limited contention protocol, Ethernet, DLL Switching.

UNIT-V: THE NETWORK LAYER

Network Layer Design Issues, Routing Algorithms: Shortest path, Flooding, Distance vector, Hierarchical, Broadcast and Multicast, Congestion Control Algorithms, Internetworking, The Network Layer in the Internet: The IP Protocol, IP Addresses, Internet Control Protocols, Ipv6 Main Header.

UNIT-VI: THE TRANSPORT LAYER

Transport Service, Elements of transport protocol, Internet Transport layer protocols: UDP and TCP.

UNIT-VII: THE APPLICATION LAYER

DNS: The Domain name system, Electronic Mail, World Wide Web: Architectural Overview, Dynamic Web Document, HTTP.

UNIT-VIII: IEEE STANDARDS AND NETWORK SECURITY

Introduction to IEEE standards, Wi-Fi: 802.11b, Bluetooth: 802.15, 3G: 802.16, 4G: 802.16m, Wi-Max: 802.16a.

Introduction to Network Security: Cryptography - Substitution Techniques, Transposition Techniques.

TEXT BOOK:

1. A.S. Tanenbaum, *Computer Networks,* 4th edition, Pearson Education/PHI.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, *Data communication and Networking,* Tata McGraw-Hill, 2004.
2. Peterson and Davie, *Computer Networks,* 2nd edition, Morgan Kaufmann.
3. Kurose, Ross, *Computer Networking,* Pearson Education, 2010.
4. Leon-Gracia and Widjaja, *Communication Networks,* 2nd edition, TMH
5. S.Keshay, *An Engg. Approach to Computer Networking,* Addison Wesley, 1997.

IV B.Tech. I Semester

10BT71201: **WEB PROGRAMMING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: A Course on "Object Oriented Programming"

COURSE DESCRIPTION: Introduction to HTML; Java Script; Extensible Markup Language (XML); Servlet Programming; Database Programming with JDBC; Introduction to JSP; JSP Tag Extensions; JSP applications with Tag Libraries.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge on HTML, Java Script, Servlets, JSP and JDBC.
2. Design and develop the client server web applications using the concepts of Servlets, JSP and JDBC.
3. Acquire programming skills in HTML, XML and JSP.
4. Apply advanced programming and scripting languages in web programming such as HTML, XML and JSP, Servlets and JDBC for application software development.

UNIT-I: INTRODUCTION TO HTML

Basic HTML, the document body, text, hyperlinks, lists, tables, images, frames, forms, Cascading Style Sheets: Introduction, simple examples, defining your own styles, properties and values in styles, formatting blocks of information, layers.

UNIT-II: JAVA SCRIPT

Basics, variables, string manipulation, arrays, functions, objects in java script, introduction to DHTML.

UNIT-III: EXTENSIBLE MARKUP LANGUAGE (XML)

XML basics, Document Type Definition, XML Schema, Presenting XML, Introduction to DOM and SAX parsers.

UNIT-IV: SERVLET PROGRAMMING

Introduction, servlet implementation, servlet configuration, servlet exceptions, servlet lifecycle, Requests and Responses: ServletRequest, ServletResponse, HttpServlet-Request, HttpServletResponse interfaces, cookies, session creation and tracking using HttpSession interface.

UNIT-V: DATABASE PROGRAMMING WITH JDBC

Database drivers, the java.sql package: connection management, database access, data types, database metadata, exceptions and warnings, loading a database driver and opening connections, establishing a connection, creating and executing sql statements querying the database, prepared statements, mapping sql types to java, transaction support, save points.

UNIT-VI: INTRODUCTION TO JSP

Introducing JSP, JSP directives, scripting elements, standard actions, implicit objects, scope and JSP pages as XML documents, introduction to MVC architecture.

UNIT-VII: JSP TAG EXTENSIONS

Introduction to javabean, advantages of javabean, introspection, getter and setter methods, introduction to JSP tag extensions, a simple tag, anatomy of a tag extension, writing tag extensions.

UNIT-VIII: JSP APPLICATIONS WITH TAG LIBRARIES

Benefits of using custom tag libraries, introducing the JSP Standard Tag Library (JSPTL), getting started with the JSPTL, integrating the JSPTL into your JSP page, the JSPTL tags.

TEXT BOOKS:

1. Chris Bates, *Web Programming Building Internet Applications,* 2nd edition, Wiley, 2007.
2. Subrahmanyam Allamaraju and Cedric Buest, *Professional Java Server Programming J2EE,* 1.3 edition, SPD (apress), 2004.

REFERENCE BOOKS:

1. Dietel and Dietel, *Internet and World Wide Web How to program,* 4th edition, PHI, 2008.
2. David Hunter, A. Watt and Jeff Rafter, *Beginning XML,* Wiley Dreamtech, 2004.
3. J. McGovern, Rahim Adatia and Yakov Fain, *J2EE 1.4 Bible*, Wiley Dreamtech, 2004.

IV B.Tech. I Semester

10BT71202: **MOBILE COMPUTING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: A Course on "Computer Networks" and "Data communication".

COURSE DESCRIPTION: Introduction to Mobile Computing; Medium Access Control; Wireless LAN; Mobile Network and Transport Layers; Data Dissemination; Mobile Ad-Hoc Networks (MANETS); Protocols and Tools.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquire knowledge in:
    - GSM, GPRS, Wireless LAN, MANET, J2ME.
    - Protocols in Network, Transport and Application layer.
2. Analyze the issues related to database design in mobile computing applications.
3. Apply routing algorithms for finding shortest path in MANETS.

UNIT-I: MOBILE COMPUTING

Introduction, History, architecture, devices and applications, limitations.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT-II: MEDIUM ACCESS CONTROL

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT-III: WIRELESS LAN

Infrared vs. radio transmission, Infrastructure and ad hoc networks, IEEE 802.11.

HiperLAN: Protocol architecture, physical layer, Channel access control sub-layer, MAC sub-layer, Information bases and networking.

Bluetooth: User scenarios, physical layer, MAC layer, networking, security, link management.

UNIT-IV: MOBILE NETWORK AND TRANSPORT LAYERS

Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT-V: DATABASE ISSUES

Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT-VI: DATA DISSEMINATION

push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing techniques.

UNIT-VII: MOBILE AD HOC NETWORKS (MANETS)

Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs

UNIT-VIII: PROTOCOLS AND TOOLS

Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers) and J2ME.

TEXT BOOKS:

1. Rajkamal, *Mobile Computing,* 2nd edition, OXFORD University Press, 2008.
2. Jochen Schiller, *Mobile Communications,* 2nd edition, Pearson Education, 2003.

REFERENCE BOOKS:

1. Stojmenovic and Cacute, *Handbook of Wireless Networks and Mobile Computing,* John Wiley, 2002.
2. Hansmann, Merk, Nicklous, Stober, *Principles of Mobile Computing,* 2nd edition, Springer, 2003.

IV B.Tech. I Semester

10BT71203: **MULTIMEDIA AND APPLICATIONS DEVELOPMENT**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: Courses On "Object Oriented Programming" and "Computer Graphics".

COURSE DESCRIPTION: Introduction to Multimedia; Fundamental Concepts in Audio and Video; Action Script 2.0; Multimedia Data Compression; Multimedia Network Communications and Applications.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain fundamental knowledge on image, audio, video representations & standards and multimedia network communications.
2. Apply ActionScript principles, functions and components for developing multimedia authoring applications.
3. Apply various lossy/lossless coding techniques on text and images for compression and decompression.
4. Continue study on Audio and Video compression techniques individually.

UNIT-I: INTRODUCTION TO MULTIMEDIA

Definition of multimedia, multimedia and hypermedia, World Wide Web, multimedia software tools, graphics and image data representations: graphics/image data types, file formats, color models in images, color models in video.

UNIT-II: FUNDAMENTAL CONCEPTS IN AUDIO AND VIDEO

Definition of sound, Digitization, Nyquist theorem, signal to noise ratio, signal to quantization-noise ratio, MIDI, types of video signals, analog video, digital video.

UNIT-III: ACTIONSCRIPT-I

ActionScript 2.0 Features, Data types and type checking: static typing, type syntax, compatible types, casting, ActionScript 2.0 type checking, Classes: defining classes, constructor functions, properties, methods.

UNIT-IV: ACTIONSCRIPT-II

Inheritance: A primer on inheritance, subclasses as subtypes, overriding methods and properties, constructor functions in subclasses, polymorphism and dynamic binding, Interfaces: introduction, syntax and use, Packages: syntax, defining packages, package access and classpath, Exceptions: the exception handling cycle, exception bubbling, finally block, nested exceptions, limitations.

UNIT-V: ACTIONSCRIPT-III

Authoring an ActionScript 2.0 class, An OOP Application Development, Using Components with ActionScript 2.0, MovieClip Subclasses.

UNIT-VI: MULTIMEDIA DATA COMPRESSION-I

Lossless compression algorithms: introduction, basics of information theory, run length coding, variable length coding, dictionary based coding, arithmetic coding, lossless image compression, Lossy compression algorithms: quantization,transform coding,wavelet based coding.

UNIT-VII: MULTIMEDIA DATA COMPRESSION-II

Image compression techniques: JPEG standard, JPEG 2000, Audio compression techniques: ADPCM in speech coding, G.726 ADPCM, Vocoders, Video compression techniques: Introduction to video compression, video compression based on motion compensation, MPEG-1, MPEG-2.

UNIT-VIII: 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. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia,* Pearson Education, 2008.
2. Colin Moock, *Essentials ActionScript 2.0,* SPD O'Reilly, 2005.

REFERENCE BOOKS:

1. Nigel Chapman and Jenny Chapman, *Digital Multimedia,* 2nd edition, Wiley Dreamtech, 2004.
2. Brian Underdahl, *Macromedia Flash MX,* TMH, 2002.
3. Fred Halsall, *Multimedia Communications,* Pearson, 2004
4. K.R.Rao, Zoram S. Bojkovic, *Multimedia Communication Systems,* Pearson Education, 2002.

IV B.Tech. I Semester

10BT71204: **CRYPTOGRAPHY AND NETWORK SECURITY**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on"Computer Networks".

COURSE DESCRIPTION: Overview of security attacks, services, and mechanisms; Encryption Principles- public and private encryption algorithms, authentication algorithms; e-mail security; IP security; Web security; Network Management security, System security- Intrusion detection techniques, Malicious software- various types of viruses and Firewalls.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge on:
    - Conventional Encryption
    - Public key cryptography
    - Key distribution Approaches
    - Hashing Algorithms
2. Analyze network security issues in private and public networks.
3. Apply suitable cryptographic technique for a given security problem.

UNIT-I: INTRODUCTION

Security Attacks - Interruption, Interception, Modification and Fabrication. Security Services - Confidentiality, Authentication, Integrity, Non-repudiation, Access Control and Availability. Security Mechanisms. A model for Internetwork security, Internet Standards and RFCs, Conventional Encryption Principles, Ceaser Cipher, Hill cipher, Poly and Mono Alphabetic Cipher.

UNIT-II: ENCRYPTION PRINCIPLES

Conventional encryption algorithms: Feistal structure, DES algorithm, S-Boxes, Triple DES, Advanced Data Encryption Standard (AES),Cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT-III: CRYPTOGRAPHY AND APPLICATIONS

Public key cryptography principles, public key cryptography algorithms, Digital signatures, RSA, Elliptic Algorithms, Digital Certificates, Certificate Authority and key management, Kerberos, X.509 Directory Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY

Email privacy: PGP operations, Radix-64 Conversion, Key Management for PGP, PGP Trust Model, Multipurpose Internet Mail Extension (MIME), Secure MIME (S-MIME).

UNIT-V: IP SECURITY ARCHITECTURE AND SERVICES

IP Security Overview, IP Security Architecture, Security Association, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management: OAKLEY key determination protocol, ISAKMP.

UNIT-VI: WEB SECURITY

Web Security Considerations, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT-VII: NETWORK MANAGEMENT SECURITY

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.

System Security: Intruders-Intrusion techniques, Intrusion Detection, Password Management, Botnets.

Malicious Software: Viruses and related threats, Virus Counter Measures, Distributed Denial of Service Attacks.

UNIT-VIII: FIREWALLS

Firewall Design principles, Trusted Systems, Common Criteria for Information Technology Security Evolution.

TEXT BOOKS:

1. William Stallings, Network Security Essentials Applications and Standards, 3rd edition, Pearson Education.
2. Stallings, Cryptography and network Security, 3rd edition, PHI/Pearson.

REFERENCE BOOKS:

1. Eric Maiwald, *Fundamentals of Network Security,* Dreamtech press, 2004.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, *Network Security - Private Communication in a Public World,* 2nd edition, Pearson/PHI.
3. Robert Bragg, Mark Rhodes, *Network Security: The complete reference*, TMH, 2004.
4. Buchmann, *Introduction to Cryptography,* 2nd edition, Springer, 2004.

IV B.Tech. I Semester

10BT71207: **ADVANCED DATABASES**

(ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: A course on "Database Management Systems"

COURSE DESCRIPTION: Distributed Data Processing, Distributed DBMS Architecture; Distributed Database Design; Optimization of Distributed Queries; Distributed Concurrency Control; Database Security; XML and Internet Databases; Geographic Information Systems; Advanced Databases and applications

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquire knowledge on distributed database design and security.
2. Perform analysis of distributed database design principles for building advanced database systems.
3. Design and develop various query optimization techniques to improve query performance.

UNIT-I: INTRODUCTION

Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: DBMS Standardization, Architectural Models for Distributed DBMSs, Distributed DMBS Architecture.

UNIT-II: DISTRIBUTED DATABASE DESIGN

Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

Query Processing and Query Decomposition: Query Processing Objectives, Characterization of query processors, layers of query processing, Query decomposition, Localization of distributed data.

UNIT-III: OPTIMIZATION OF DISTRIBUTED QUERIES

Query optimization, centralized query optimization, Distributed query optimization algorithms**.**

Introduction to Transaction Management: Definition of a Transaction, Properties of Transactions, Types of Transactions.

UNIT-IV: DISTRIBUTED CONCURRENCY CONTROL

Serializability Theory, Taxonomy of concurrency control Mechanisms, Locking based Concurrency control Algorithms, Time stamp based and Optimistic concurrency control Algorithms, Deadlock Management.

UNIT-V: DATABASE SECURITY

Security Issues, Granting and Revoking Privileges, Multilevel Security, Statistical Database Security, Challenges of Database Security.

UNIT-VI: XML AND INTERNET DATABASES

Structured, Semistructured and Unstructured data, XML Hierarchical Data Model, XML Documents and Databases, XML Schema.

UNIT-VII: GEOGRAPHIC INFORMATION SYSTEMS

Applications, Data Management Requirements, Data Operations, problems and Future Issues.

UNIT-VIII: ADVANCED DATABASES AND APPLICATIONS

Object Databases, Temporal Databases, *Multimedia Databases, Spatial Databases, Mobile Databases, Data mining Concepts and Overview of Data warehousing and OLAP*.

TEXT BOOKS:

1. M.Tamer OZSU and Patrick Valduriez, *Principles of Distributed Database Systems,* Pearson Eduction, 2008.
2. R.Elmasri, S.B.Navathe, S.K.Gupta, D.V.L.N.Somayajulu, *Fundamentals of DB Systems,* Pearson Education, 2008.

REFERENCE BOOKS:

1. Stefano Ceri and Giuseppe Pelagatti, *Distributed Databases: Principles and Systems,* TMH, 1985.
2. Henry F Korth, A Silberchatz and S.Sudarshan*, Database System Concepts,* 5th edition, MGH, 2006.
3. Raghu Ramakrishnan and Johhanes Gehrke, *Database Management Systems,* 3rd edition, MGH, 2003.

IV B.Tech. I Semester

10BT71208: **SOFTWARE PROJECT MANAGEMENT**

(ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	**70**	**100**	**4**	**-**	**-**	**4**

PRE-REQUISITES: A Course on "Software Engineering"

COURSE DESCRIPTION: Software Efforts Estimation Techniques; Improving Software Economics; Life Cycle Phases; Model based Software Architectures; Checkpoints of the Process; Project Organizations and Responsibilities; Project Control and Process Instrumentation; and Next Generation Software Economics.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge on:
    - Software effort estimation and costing of software.
    - Life cycle phases
    - Software process workflows.
2. Analyze the importance of various milestones and metrics in software project management.
3. Demonstrate skills of project management and process measurement in software projects.

UNIT-I: SOFTWARE EFFORTS ESTIMATION TECHNIQUES

The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT-II: IMPROVING SOFTWARE ECONOMICS

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections, The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT-III: LIFE CYCLE PHASES

Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT-IV: MODEL BASED SOFTWARE ARCHITECTURES

A Management perspective and technical perspective.

Workflows of the process: Software process workflows, Iteration workflows,

UNIT-V: CHECKPOINTS OF THE PROCESS

Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-VI: PROJECT ORGANIZATIONS AND RESPONSIBILITIES

Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building blocks, The Project Environment.

UNIT-VII: PROJECT CONTROL AND PROCESS INSTRUMENTATION

The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants.

UNIT-VIII: NEXT GENERATION SOFTWARE ECONOMICS

Modern Project Profiles, Next generation Software economics, modern process transitions.

Case studies: The command Center Processing and Display system- Replacement (CCPDS-R), Process Improvement and Mapping to the CMM.

TEXT BOOK:

1. Walker Royce, *Software Project Management,* Pearson Education, 2005.

REFERENCE BOOKS:

1. Bob Hughes and Mike Cotterell, *Software Project Management,*Tata McGraw- Hill Edition,2006.
2. Joel Henry, *Software Project Management,* Pearson Education, 2003.

IV B.Tech. II Semester

10BT81201: **SERVICE ORIENTED ARCHITECTURE**

(ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: Web Technologies and Software Engineering

COURSE DESCRIPTION: Introduction to SOA, Web services & Primitive SOA; WS extensions; Principles of SOA, Service Layers, Delivery strategies; Service Modeling; Service and Business process design- Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL), and Web Services- Business Process Execution Language (WS-BPEL).

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge on:
    - Primitive SOA, Contemporary SOA
    - Fundamental of web services
    - Principles, services and Policies of Service Orientation
2. Able to analyze complex business process critically in identifying appropriate service model logic.
3. Gain skills on Technologies: XML, WSDL, WS-BPEL related to SOA.

UNIT-I: INTRODUCING SOA

Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA.

The Evolution of SOA: An SOA Timeline, The continuing evolution of SOA, The roots of SOA.

UNIT-II: WEB SERVICES AND PRIMITIVE SOA

The Web Services Frame work, Services, Service descriptions, Messaging.

Web Services and Contemporary SOA (Part I-Activity Management and Composition): Message exchange patterns, Service Activity Coordination, Atomic transactions, Business Activities, Orchestration, and Choreography.

UNIT-III: WEB SERVICES AND CONTEMPORARY SOA (PART II-ADVANCED MESSAGING, METADATA, AND SECURITY)

Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing.

UNIT-IV: PRINCIPLES OF SERVICE-ORIENTATION

Service - Orientation and the enterprise, Anatomy of SOA, Common Principles of Service-Orientation, Interrelation between Principles of Service-Orientation, Service Orientation and Object Orientation, Native Web Services support for Principles of Service-Orientation.

UNIT-V: SERVICE LAYERS

Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

SOA Delivery Strategies: SOA delivery lifecycle phases, The top-down strategy, The bottom-up strategy, The agile strategy.

UNIT-VI: SERVICE ORIENTED ANALYSIS

Part I-Introduction: Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services.

Part II-Service Modeling: Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT-VII: SERVICE ORIENTED DESIGN

Part I-Introduction: Introduction to Service-Oriented design, WSDL related XML Schema language basics, WSDL language basics, Service interface design tools.

Part II-SOA Composition Guidelines: SOA Composing steps, Considerations for choosing service layers, Considerations for positioning core SOA standards, Considerations for choosing SOA extensions.

Part III-Service Design: Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines.

UNIT-VIII: SERVICE ORIENTED DESIGN (PART IV-BUSINESS PROCESS DESIGN)

WS-BPEL language basics, WS- Coordination overview, Service Oriented Business process Design.

Fundamental WS-* Extensions: WS-Addressing language basics, WS-Reliable Messaging language basics, WS-Policy language basics, WS-Metadata Exchange language basics, WS-Security language basics**.**

TEXT BOOK:

1. Thomas Erl, *Service-Oriented Architecture - Concepts, Technology, and Design,* Pearson Education, 2005.

REFERENCE BOOKS:

1. Jeff Davies & others, *The Definitive guide to SOA,* Apress, Dreamtech, 2007.
2. E.Hewitt, *Java SOA Cook book,* SPD, 2009.
3. N. M. Josuttis , *SOA in Practice,* SPD, 2007.
4. M.Rosen and others, *Applied SOA,* Wiley India pvt. Ltd, 2009.

IV B.Tech. II Semester

10BT81202: **INFORMATION RETRIEVAL SYSTEMS**

(ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: A Course on "Database Management Systems"**.**

COURSE DESCRIPTION: Introduction; Information Retrieval System Capabilities; Cataloging and Indexing; Data Structures; Automatic Indexing; Document and Term Clustering; User Search Techniques; and Text Search Algorithms.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquires knowledge in:
    - Introduction about Information Retrieval Systems.
    - Features and capabilities of Information Retrieval System.
2. Design and develop various indexing methods and data structures to extract and to store data items.
3. Acquire problem solving skills to apply clustering algorithms to classify similar data items into classes, text search techniques to retrieve relevant information and evaluation of information retrieval systems.

UNIT-I: INTRODUCTION

Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

UNIT-II: INFORMATION RETRIEVAL SYSTEM CAPABILITIES

Search, Browse, Miscellaneous.

UNIT-III: CATALOGING AND INDEXING

Objectives, Indexing Process, Automatic Indexing, Information Extraction.

UNIT-IV: DATA STRUCTURES

Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT-V: AUTOMATIC INDEXING

Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

UNIT-VI: DOCUMENT AND TERM CLUSTERING

Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT-VII: USER SEARCH TECHNIQUES

Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext.

Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

UNIT-VIII: TEXT SEARCH ALGORITHMS

Introduction, Software text search algorithms, Hardware text search systems.

Multimedia Information Retrieval: Audio retrieval, Graph retrieval, Image retrieval, Video retrieval.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example - TREC results.

TEXT BOOK:

1. Kowalski, Gerald, Mark T Maybury, *Information Storage and Retrieval Systems: Theory and Implementation,* Kluwer Academic Press, 1997.

REFERENCE BOOKS:

1. Frakes, W.B., Ricardo Baeza-Yates, *Information Retrieval Data Structures and Algorithms,* Prentice Hall, 1992.
2. Ricardo Baeza-Yates, *Modern Information Retrival,* Pearson Education, 1997.
3. Robert Korfhage, *Information Storage and Retieval,* John Wiley and Sons, 1997.

IV B.Tech. II Semester

10BT81204: **DISTRIBUTED SYSTEMS**

(ELECTIVE- III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: A Course on "Operating Systems".

COURSE DESCRIPTION: Introduction to Distributed Systems; Time and Global States; Inter Process Communication; Operating System Support; Distributed File Systems; Distributed transactions and concurrency control; and Distributed shared memory.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge: Networking, Internetworking and Inter Process Communication, Distributed File Systems, Distributed transactions and concurrency control, Distributed shared memory.
2. Analyze issues of internet to establish Inter-Process Communication and Distributed File Systems
3. Develop Distributed transaction using concurrency control principles and shared memory concepts.

UNIT-I: INTRODUCTION

Introduction to Distributed systems, Examples of distributed systems, Resource sharing and the web, Challenges. System models: Introduction, Architectural models, Fundamental models.

UNIT-II: TIME AND GLOBAL STATES

Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Global states, Distributed debugging, Distributed mutual exclusion.

UNIT-III: NETWORKING AND INTERNETWORKING

Introduction, Types of network, Network principles, Internet protocols, Network case studies: Ethernet, Wireless LAN and ATM.

UNIT-IV: INTER PROCESS COMMUNICATION

Introduction, The API for the internet protocols, External data representation and marshalling, Client server communication, Group Communication, Case study.

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.

UNIT-V: OPERATING SYSTEM SUPPORT

Operating system layer, Protection, Process and Threads, Communication and invocation, Operating System Architecture.

UNIT-VI: DISTRIBUTED FILE SYSTEMS

File System Architecture, SUN Network File System, The Andrew File System, Recent advances.

Name Services: Introduction, Name services and the Domain Name System, Directory and discovery services, Case study of the Global Name Services.

UNIT-VII: DISTRIBUTED TRANSACTIONS AND CONCURRENCY CONTROL

[No. of Periods: 09]

Transactions, Nested Transactions, Locks, Optimistic Concurrency control, Time stamp ordering. Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in Distributed transactions, Distributed deadlocks, Transaction recovery.

UNIT-VIII: DISTRIBUTED SHARED MEMORY

Design and implementation issues, Sequential consistency and ivy, Release consistency and Munin, Other consistency models.

TEXT BOOK:

1. G Coulouris, J Dolimore and T Kindberg, *Distributed Systems Concepts and Design,* 3rd edition, Pearson Education, 2002.

REFERENCE BOOKS:

1. A.S.Tanenbaum and M.V.Steen, *Distributed Systems - Principles and Paradigms,* Pearson Education, 2002.
2. M Singhal, N G Shivarathri, *Advanced Concepts in Operating Systems,* Tata McGraw-Hill Edition, 2003.

IV B.Tech. II Semester

10BT81205: **MIDDLEWARE TECHNOLOGIES**

(ELECTIVE- III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PRE-REQUISITES: Nil

COURSE DESCRIPTION: Introduction to client server computing; CORBA with JAVA; Introducing C# and the .NET platform; Building C# applications; Core CORBA / JAVA; Existential CORBA; JAVA Bean Component Model; and EJBS and CORBA.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Acquire in depth knowledge in middleware platforms such as .Net, JAVA and CORBA.
2. Acquire concepts of computing models for client server architecture.
3. Develop programming skills for software oriented architecture in JAVA, CORBA and C#.
4. Design application oriented architectures using middleware technologies.

UNIT-I: INTRODUCTION TO CLIENT SERVER COMPUTING

Evolution of corporate computing models from centralized to distributed computing, client server models, Benefits of client server computing, pitfalls of client server programming.

UNIT-II: CORBA WITH JAVA

Review of Java concept like RMI, RMI API, JDBC, Client/Server CORBA-style, The object web.

UNIT-III: INTRODUCING C# AND THE .NET PLATFORM

Object -Oriented Programming with C#, Callback Interfaces, Delegates and Events, Understanding .NET Assemblies.

UNIT-IV: BUILDING C# APPLICATIONS

Type Reflection, Late Binding and Attribute-Based Programming, Object Serialization and the .NET Remoting Layer, Data Access with ADO.NET, XML Web Services.

UNIT-V: CORE CORBA / JAVA

Two types of Client/ Server invocations-static, dynamic, The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count, multi count.

UNIT-VI: EXISTENTIAL CORBA

CORBA initialization protocol, CORBA activation services, CORBA IDL mapping, CORBA java- to-IDL mapping, The introspective CORBA/Java object.

UNIT-VII: JAVA BEAN COMPONENT MODEL

Events, properties, persistency, Intrespection of beans, CORBA Beans.

UNIT-VIII: EJBS AND CORBA

Object transaction monitors, CORBA OTM's, EJB and CORBA OTM's, EJB container framework, Session and Entity Beans, The EJB client/server development Process, the EJB container protocol, support for transaction, EJB packaging, EJB design Guidelines**.**

TEXT BOOKS:

1. Robert Orfali and Dan Harkey, *Client/Server programming with Java and CORBA,* 2nd edition, John Wiley and Sons, 2008.
2. Andrew Troelsen, *C# and the .NET Platform,* 2nd edition, Apress Wiley-dreamtech, 2003.

REFERENCE BOOKS:

1. D T Dewire, *Client/Server Computing,* 2nd edition, Tata Mc GrawHill Publications, 2008.
2. Robert Orfali Dan Harkey and Jeri Edwards, *Client/Server Survival Guide,* 3rd edition, John Wiley and Sons, 2008.

IV B.Tech. II Semester

10BT81206: **SOFTWARE PATTERNS**

(ELECTIVE- IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: Courses on "Software Development Methodologies," and "Object Oriented Programming".

COURSE DESCRIPTION: Envisioning Software Architecture; Creating an Architecture; Analyzing architectures; Introduction to Design Patterns; Creational Patterns; Structural Patterns; Structural Patterns; Behavioral Patterns and Case studies.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge in:
    - Software architecture styles and business life cycle.
2. Various design issues and patterns.
3. Analyze and identify architectural styles and patterns to solve software design problems.
4. Apply appropriate software pattern to solve problems in object oriented software design process.

UNIT-I: ENVISIONING ARCHITECTURE

Definition of Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views and the Architecture Business Cycle.

UNIT-II: CREATING AN ARCHITECTURE

Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT-III: ANALYZING ARCHITECTURES

Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

Moving from One System to Many: Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT-IV: INTRODUCTION TO DESIGN PATTERNS

Definition, Pattern Description, Organizing catalogs, Role in solving design problems, Selection and Usage.

UNIT-V: CREATIONAL PATTERNS

Abstract factory, builder, factory method, prototype, singleton.

Structural Patterns**:** Adapter, bridge, composite, decorator, façade, flyweight, Proxy.

UNIT-VI: STRUCTURAL PATTERNS

Decorator, façade, flyweight, Proxy**.**

Behavioral Patterns: Chain of responsibility, command.

UNIT-VII: BEHAVIORAL PATTERNS

Interpreter, iterator, mediator, memento, observer, state, strategy, template method, and visitor.

UNIT-VIII: CASE STUDIES

Designing a Document Editor - Design issues of Lexi Editor in Deign Patterns, The World Wide Web - a case study in interoperability.

TEXT BOOKS:

1. Len Bass, Paul Clements and Rick Kazman, *Software Architecture in Practice,* 2nd edition, Pearson Education, 2003.
2. Erich Gamma, *Design Patterns,* Pearson Education, 1995.

REFERENCE BOOKS:

1. David M. Dikel, David Kane and James R. Wilson, *Software architecture,* Prentice Hall PTR, 2001.
2. Eric Freeman and Elisabeth Freeman, *Head First Design patterns,* O'REILLY, 2007.
3. Steven John Metsker and William C. Wake, *Design Patterns in Java,* Pearson education, 2006.

IV B.Tech. II Semester

10BT81207: WIRELESS NETWORKS

(ELECTIVE-III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION: Generations of Wireless networks; Characteristics of the wireless medium; Physical layer alternatives for wireless networks; Wireless medium access alternatives; Network planning; Wireless network operation; Wireless WANs; Wireless LANs

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire basic knowledge in :
   - i) Wireless network architecture and different generations of architecture.
   - ii) Characteristic of wireless medium.
   - iii) Communication techniques at physical and medium access layer.
2. Develop skills in wireless network planning and operation for GSM and CDMA system.

DETAILED SYLLABUS:

UNIT-I: OVERVIEW OF WIRELESS NETWORKS

Introduction: Information Network infrastructure, Overview of existing network infrastructure, Applications, Evaluation of voice-oriented wireless Networks, Evaluation of Data-oriented wireless Networks, different generations of Wireless networks: 1G, 2G, 3G and beyond.

UNIT-II: CHARACTERISTICS OF THE WIRELESS MEDIUM

Introduction, radio propagation mechanisms, path-loss modeling and signal coverage, effects of multi path and Doppler, channel measurement and modeling techniques.

UNIT-III: PHYSICAL LAYER ALTERNATIVES FOR WIRELESS NETWORKS

Introduction, applied wireless transmission techniques, short distance base band transmission, UWB pulse transmission, Carrier Modulated transmission, Broadband modems for higher speeds, Spread Spectrum transmissions, High-speed Modems for Spread spectrum technology, Diversity and Smart Receiving Techniques, Comparison of modulation schemes, Coding techniques for wireless communications.

UNIT-IV: WIRELESS MEDIUM ACCESS ALTERNATIVES

Introduction, fixed-assignment access for Voice-Oriented networks, Random access for Data-Oriented Networks, Integration of Voice and Data Traffic: Data Integration in voice- Oriented Networks and Voice Integration into Data- Oriented Networks.

UNIT-V: NETWORK PLANNING

Introduction, wireless network topologies, Cellular Topology, Cell Fundamentals, Signal-to-interference ratio calculation, capacity Expansion Techniques, network planning for CDMA systems.

IV B.Tech, I Semester

10BT40502: OBJECT ORIENTED PROGRAMMING

(Common to ECE, EIE, EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

PRE-REQUISITES: A Course on Problem solving and Computer programming.

COURSE DESCRIPTION: Object Oriented Thinking; Polymorphism and Inheritance; Basics of Java; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling and Swings.

Course Outcomes:

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

CO1. Learn object oriented programming principles-Object, Class, Inheritance, Polymorphism, encapsulation, Abstraction, message passing.

CO2. Gain Problem solving skills using multithreading, event handling, AWT, swings and applets.

CO3. Apply C++ and JAVA programming to solve real time problems and develop advanced applications.

CO4. Imbibe creative thinking and independently develop novel applications.

UNIT-I: INTRODUCTION TO OBJECT ORIENTED PROGRAMMING

Need for OOP paradigm, OOP concepts, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions. C++ class overview-class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete).

UNIT-II: POLYMORPHISM AND INHERITANCE

Function overloading, operator overloading, generic programming-function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, abstract classes, Streams.

UNIT-III: BASICS OF JAVA

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects - concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-IV: INHERITANCE AND INTERFACES

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism-method overriding, abstract classes. Interfaces: differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V: EXCEPTION HANDLING

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages,

Exception handling: Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

UNIT-VI : MULTITHREADING AND APPLETS

Differences between multithreading and multitasking, thread life cycle, creating threads, synchronizing threads. Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets ,Graphics class.

UNIT-VII : EVENT HANDLING

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components-labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scroll pane, dialogs, menu bar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT-VIII: SWINGS

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing - Japplet, JFrame and JComponent, Icons and labels, text fields, The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed panes, Scroll Panes, Trees and Tables.

TEXT BOOKS:

1. Robert Lafore, Waite Group's *Object-Oriented Programming in C++,* 3rd Edition, 2007.
2. Herbert schildt, *Java; The Complete Reference*, 7th Edition, TMH, 2008.

REFERENCES:

1. Y. Daniel Liang, *Introduction to Java Programming*, 6th Edition, Pearson Education.
2. Cay.S.Horstmann and Gary Cornell, *Core Java 2 Fundamentals,* 7th Edition, Vol I, Pearson Education.
3. S.B.Lippman, *C++ primer,* 3rd Edition, Pearson Education.
4. W.Savitch, *Problem Solving with C++, The OOP*, 4th Edition, Pearson Education.
5. B. Stroustrup, T*he C++ Programming Language*, 3rd Edition, Pearson Education.

IV B.Tech, I Semester

10BT71301 : NEURAL NETWORKS AND FUZZY SYSTEMS
(Common to EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	--	4

Prerequisite: Principles of electrical engineering.

Course Description: Architectures of artificial neural networks: feed forward and feedback networks.

Learning strategies: Supervised, Un-supervised and reinforced; Fuzzy set theory; Fuzzy systems design; applications of neural networks and fuzzy systems.

Course Outcomes:

After successful completion of the course the student is able to:

CO1. Demonstrate the knowledge in learning strategies of an artificial neural network and components of fuzzy logic system.

CO2. Design fuzzy systems and neural networks for real time problems.

CO3. Apply the various configurations of neural networks and fuzzy systems to different engineering applications.

UNIT I : INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS

Introduction, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Types of Neuron Activation Function, ANN Architectures, Supervised, Unsupervised, Reinforced Learning, Potential applications to ANN.

UNIT II : FEED FORWARD NETWORKS

Perceptron Models, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule, Back propagation, Architecture, Calculation of error, Training algorithm, Applications, Kohenen Self organizing Feature map, Architecture, Training, Learning Vector Quantizer (LVQ).

UNIT III : FEEDBACK AND COUNTER PROPAGATION NETWORKS

Hopfield network, Architecture, Training algorithm, Application. Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application.

UNIT IV : ASSOCIATIVE MEMORIES

General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms, Basic architecture BAM Energy Function, Adaptive resonant Theory, ART1, ART2, Architecture, Algorithm, Applications.

UNIT V : CLASSICAL & FUZZY SETS

Introduction to classical sets, properties, Fuzzy sets, Membership functions, Classical Relations and Fuzzy Relations, Composition.

UNIT VI : FUZZY LOGIC SYSTEM COMPONENTS
Properties of Membership Functions, Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification, methods, ë-cuts for Fuzzy Relations, Extension principle.

UNIT VII : FUZZY SYSTEMS
Natural Language, Linguistic Hedges, Fuzzy (Rule-Based) Systems, Graphical Techniques of Inference, Fuzzy Control Systems, Control System Design Problem, Simple Fuzzy Logic Controllers, Example.

UNIT VIII : NEURAL NETWORK AND FUZZY APPLICATIONS
Neural network applications: Load forecasting, Process identification, control and fault diagnosis (Image Processing).

Fuzzy logic applications: Temperature control, Cruise control application, Air conditioner control, DC motor speed control.

TEXT BOOKS:
1. S. Rajasekharan and G. A. Vijayalakshmi pai, *Neural Networks Fuzzy logic, Genetic algorithms: synthesis and applications*, PHI Publication, 2004.
2. Timothy J. Ross, *Fuzzy Logic with Engineering Applications*, McGraw-Hill Inc. 1997

REFERENCE:
1. Simon Haykin, *Neural Networks- A comprehensive foundation,* Pearson Education, 2001.
2. S.N.Sivanandam, S.Sumathi,S. N. Deepa, *Introduction to Neural Networks using MATLAB 6.0,* TMH, 2006.
3. Philip D.Wasserman, *Neural computing*, Wiley Publications.

IV B.Tech, I Semester
10BT71302 : PROGRAMMABLE LOGIC CONTROLLERS
(Common to EEE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	--	--	4

Pre requisite: Digital logic design.

Course Description: Programmable Logic Controllers (PLC) ladder programming and input/output operations; manipulate data using PLC instruction sets; Advanced motion control programming using instruction set.

Course Outcomes:

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

CO1. Have knowledge on the operation of programmable logic controllers.

CO2. Design ladder diagrams by incorporating, timers, counters, sequencers, math elements, and logic elements used in a PLC.

CO3. Construct a PLC for Analog modules and analog signal processing applications.

UNIT-I: PLC BASICS

Introduction, PLC Advantages, Disadvantages, PLC system, CPU, I/O modules and interfacing, Power supplies, Programming equipment, Programming formats, Construction of PLC ladder diagrams, Devices connected to I/O modules.

UNIT-II: PLC PROGRAMMING

Input instructions, Outputs, Operational procedures, Programming examples using contacts and coils, Fail-Safe Circuits, Drill press operation.

UNIT-III: DIGITAL LOGIC GATES AND LADDER DIAGRAMS

Digital logic gates, Boolean algebra PLC programming, Conversion examples.

Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT-IV: REGISTERS AND TIMER FUNCTIONS

Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers. Timer function & Industrial applications, Counter function & industrial applications.

UNIT-V:INTERMEDIATE FUNCTIONS

Intermediate functions: Arithmetic functions, Number comparison functions, Number conversion functions.

UNIT-VI: DATA HANDLING FUNCTIONS

Skip, Master control relay, Jump functions. PLC data move systems: Move function, FIFO, FAL, ONS, CLR & Sweep functions and their applications.

UNIT-VII: PLC FUNCTIONS WORKING WITH BITS

Bit Pattern, Changing a register bit status, Shift register functions and applications, Sequencer functions and applications, Controlling of two-axis & three axis Robots with PLC, Matrix functions.

UNIT-VIII: ADVANCED PLC FUNCTIONS

Analog modules & systems, Analog signal processing, Multi-bit Data Processing, Analog output application examples, PID principle, position indicator with PID control, PID Modules, PID tuning, PID functions, Networking of PLCs, Alternative Programming languages, PLC auxiliary commands and functions.

Text Books:

1. John W. Webb & Ronald A. Reiss, *Programmable Logic Controllers Principles and Applications,* Fifth Edition, PHI.

Reference Books:

1. M.Chidambaram, *Computer Control of Process*, Narosa 2003.

IV - B.Tech I – Semester

10BT71003: **POWER PLANT INSTRUMENTATION**

(ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE REQUISITE: Industrial Instrumentation, Electrical and Electronic Measurements.

COURSE DESCRIPTION:

Different methods of power generation; Electrical and Non electrical Parameters measurement; Combustion control in boiler; Turbine Monitoring and control; Analyzers in power plant.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Demonstrate Knowledge about:
   - Different methods of power generation ,measurement of different electrical and non electrical parameters in power plant.
   - Advanced controls in boiler and turbine.
2. Use modern tools for pollution monitoring in power plants.

DETAILED SYLLABUS :

UNIT I
An Overview of Power Generation: Brief survey of methods of power generation, Hydroelectric, Nuclear, Solar, Wind etc. Importance of Instrumentation for power generation, Thermal power plants, Building blocks, PI diagram of Boiler, Cogeneration.

UNIT II
Parameters and Measurements – I: Instrument transformers, Measurement of power-one wattmeter method, Reactive power measurement, single phase and three phase electrodynamometer power factor meter, Frequency meters: Mechanical resonance type, electrical resonance type, electrodynamometer type and ratio meter type. Trivector meter.

UNIT III
Parameters and Measurements – II: Non electrical parameters, flow of feed water, temperature, level radiation detectors, smoke density measurements, dust monitor.

UNIT IV
Combustion Control in Boilers: Basic building blocks of a boiler, types of boilers, Combustion control, control of Main header Pressure, air fuel ratio control, drum level (three element control) main and reheat steam temperature control.

UNIT V
Draught Control: Introduction, Natural draught, mechanical draught control, gas recirculation controls, deaerator level control, pulverizer control.

UNIT VI

Turbine Monitoring and Control: Condenser vacuum control, gland steam exhaust pressure control, Shell temperature monitoring and control, Lubricating oil temperature control, Hydrogen, generator cooling system.

UNIT VII

Analyzers In Power Plants – I: Thermal conductive type – paramagnetic type, Oxygen analyzer, infrared type and trim analyzer, hydrogen purity meter

UNIT VIII

Analyzers In Power Plants – II: Chromatography, pH meter, Conductivity cell, fuel analyzer, brief survey of pollution monitoring and control equipment.

TEXT BOOKS:

1. *Modern Power Stations Practice*, vol. 6, *Instrumentation, Controls and Testing*, Pergamon Press, Oxford, 1971
2. Krishnaswamy & Ponni Bala, *Power Plant Instrumentation,* PHI, 2011

REFERENCES:

1. Elonka S.M., and Kohal A.L., *Standard Boiler Operations,* TMH, 1994.
2. Wakil M.M., *Power Plant Technology,* McGraw Hill, 1984

IV - B.Tech I – Semester

10BT71006: VIRTUAL INSTRUMENTATION

(ELECTIVE - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE REQUISITE: C Programming

COURSE DESCRIPTION:

Concept of Virtual Instrumentation; Programming Techniques in VI; Data Acquisition and Networking using VI; Simulation and Real time applications.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Demonstrate knowledge in Programming techniques of Virtual Instrumentation.
2. Analyze the real time situations and requirements to design an appropriate Virtual Instrumentation system for measurement of various real time parameters.
3. Design an VI system to Automate the industrial process.
4. Select and apply appropriate VI programming techniques for a specific problem.

DETAILED SYLLABUS :

UNIT I
Virtual Instrumentation: Historical perspective, advantages, block diagram and architecture of a virtual instrument, data flow techniques, graphical programming in data flow, comparison with conventional programming. Development of Virtual Instrument using GUI, Real-time systems, Embedded Controller, OPC, HMI / SCADA software, Active X programming.

UNIT II
VI Programming Techniques: VIS and sub-VIS, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, Instrument Drivers, Publishing measurement data in the web.

UNIT III
Data Acquisition Basics: Introduction to data acquisition on PC, Sampling fundamentals, Input/Output techniques and buses. ADC, DAC, Digital I/O, counters and timers, DMA, Software and hardware installation, Calibration, Resolution, Data acquisition interface requirements.

UNIT IV
VI Chassis requirements: Common Instrument Interfaces, Current loop, RS 232C/ RS485, GPIB.

UNIT V
BUS Interfaces: USB, PCMCIA, VXI, SCSI, PCI, PXI, Firewire. PXI system controllers, Ethernet control of PXI. Networking basics for office & Industrial applications, VISA and IVI.

UNIT VI
Networking: Networking Basics for office and Industrial applications, VISA and IVI, Distributed I/O modules.

UNIT VII

Mathematics and Simulation in LabVIEW: Fourier Transforms, power spectrum, correlation methods, windowing & filtering.

UNIT VIII

VI Applications: Development of Control system, Industrial Communication, Image acquisition and processing, Motion control, LabVIEW based fuzzy logic and genetic algorithm.

TEXT BOOKS:

1. Gary Johnson, *LabVIEW Graphical Programming,* 2nd Edition, McGraw Hill New York, 1997.
2. Lisa K. wells & Jeffrey Travis, *LabVIEW for everyone,* Prentice Hall, New Jersey, 1997.

REFERENCES:

1. Kevin James, *PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control,* Newnes, 2000.

IV B.Tech. I Semester

10BT70405: EMBEDDED AND REALTIME SYSTEMS

(Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A course on Microprocessors and Microcontrollers.

COURSE DESCRIPTION:

Introduction to Embedded System; Analysis of General Purpose Processor; State Machines and Concurrent Process Models; Various Communication interfacing Models; Embedded/ RTOS Concepts; Kernal objects; Target Architectures; Design Technology.

COURSE OUTCOMES: After completion of the course, students should be able to:

On successful completion of this course the students will be able to

CO1. Demonstrate fundamental knowledge on

- Communication Interfacing Models
- Kernal Objects
- ARM and SHARC Controllers

CO2. Analyze Various problems in

- Processor Technology
- State Machines
- Concurrent Process Models
- Design Technology

CO3. Design and develop Embedded system to suit a particular application.

CO4. Choose suitable Hardware and software components of a system that work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS :

UNIT-I: INTRODUCTION
Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT-II: GENERAL PURPOSE PROCESSORS
Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Microcontrollers and Digital Signal Processors.

UNIT-III: STATE MACHINE AND CONCURRENT PROCESS MODELS
Introduction, models versus languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent

processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

UNIT-IV: COMMUNICATION INTERFACE
Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, I^2C bus and CAN.

UNIT-V: EMBEDDED/RTOS CONCEPTS–I
Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, resource sharing, Commercial RTOs.

UNIT-VI: EMBEDDED/RTOS CONCEPTS–II
Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT-VII: TARGET ARCHITECUTERS
Host and target machines, linkers, loading software into target machine, debugging techniques, ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, salient features of SHARC microcontroller and comparison with ARM microcontroller.

UNIT-VIII: DESIGN TECHNOLOGY
Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

TEXT BOOKS:

1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dreamtech Press, 2005.
3. Santanu Chattopadyay, *Embedded System Design,* PHI, 2010.

REFERENCE BOOKS:

1. Jonathan W. Valvano, Brooks/Cole, *Embedded Microcomputer Systems,* Thompson Learning, 2002.
2. David E. Simon, *An Embedded Software Primer,* Pearson Education, 2005.
3. Sri Ram VIyer, Pankaj Gupta, *Embedded Real Time Systems Programming,* TMH, 2004.

IV - B.Tech I – Semester

10BT71007: TELEMETRY AND TELECONTROL

(ELECTIVE - II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE REQUISITE: Principles of communication, optoelectronics and Laser Instrumentation.

COURSE DESCRIPTION:

Different Telemetry Principles; Symbols and codes; Frequency and Time-division Multiplexed Systems; Satellite Telemetry; Optical Telemetry; Microwave Telemetry and Telecontrol Methods.

COURSE OUTCOMES: After completion of the course the students are able to:

1. Demonstrate knowledge on different Telemetry Principles, Satellite Telemetry, Optical Telemetry, and Microwave Telemetry.
2. Analyze and solve errors during transmission.
3. Design transmitter and receiver circuits for data transmission.
4. Apply appropriate telemetry principles for data transmission in real time.

DETAILED SYLLABUS :

UNIT I
Telemetry Principles: Introduction, Functional blocks of Telemetry system, Methods of Telemetry: Non Electrical, Electrical, Pneumatic, Frequency, Power Line Carrier Communication.

UNIT II
Symbols and Codes: Bits and Symbols, Time function pulses, Line and Channel Coding, Modulation Codes. Intersymbol Interference.

UNIT III
Frequency Division Multiplexed Systems: FDM, IRIG Standard, FM and PM Circuits, Receiving end, PLL.

UNIT IV
Time Division Multiplexed Systems: TDM, PAM, PAM /PM and TDM, PCM Systems. PCM reception. Differential PCM. Introduction, QAM, Protocols.

UNIT V
Satellite Telemetry: General considerations, TT&C Service, Digital Transmission systems, TT&C Subsystems, Telemetry and Communications.

UNIT VI
Optical Telemetry: Optical fibers Cable, Sources and detectors. Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System.

UNIT VII
Microwave Telemetry: Introduction, microwave spectrum and bands, rectangular Wave guides, microwave transmitter, microwave receiver, Applications of Microwave telemetry.

UNIT VIII

Telecontrol Methods: Analog and Digital techniques in Telecontrol, Telecontrol apparatus , Remote adjustment, Guidance and regulation, Telecontrol using information theory , Example of a Telecontrol System

TEXT BOOKS:

1. D. Patranabis, *Telemetry Principles,* TMH
2. Swoboda G., *Telecontrol Methods and Applications of Telemetry and Remote Control*, Reinhold Publishing Corp., London, 1991

REFERENCES:

1. M. Kulakarni, *Microwave and Radar Engineering*, 9th Edition, Umesh Publications, 1998
2. Gruenberg L., *Handbook of Telemetry and Remote Control*, McGraw Hill, New York, 1987
3. Young R.E., *Telemetry Engineering*, Little Books Ltd., London, 1988
4. Housley T., *Data Communication and Teleprocessing System*, Printice Hall International, Englewood Cliffs, New Jersey, 1987

IV B.Tech, II Semester
10BT70421 : ADVANCED MICROPROCESSORS AND MICROCONTROLLERS (ELECTIVE - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

Prerequisites: Courses on Digital Logic Design, Computer Organization, Microprocessors and Microcontrollers.

Course Description: Architecture, Memory Management, Instruction set for Intel family of Processors from 80286 to Dual core processors; Intel 80C31/51- Architecture, Instruction set, Real time control; Intel 80196, ARM Processors-on chip resources, Programming.

Course Outcomes: After completion of the course, students should be able to:

CO1. Gain knowledge in
- Internal hardware details of Intel family of processors.
- 8/16/32 bit Microcontrollers on chip resources and their usage.
- Interfacing various peripherals to build stand alone systems.

CO2. Critically analyze various memory management techniques.
CO3.Design and develop microcomputer based system to suit a particular application.
CO4. Choose suitable Hardware and software components of a system that work together to solve engineering problems.

UNIT I : THE 80286 MICROPROCESSORS

Architecture, Register Organization, Addressing Modes and over view on instruction set of 80286.

UNIT II : THE 80386 AND 80486 MICROPROCESSORS

Architectural features, Register Organization, Memory management, Virtual 8086 mode, The Memory Paging Mechanism.

UNIT III : THE PENTIUM AND PENTIUM PRO PROCESSORS

The Memory System, Input/output system, Branch Prediction Logic, Cache Structure, Pentium Registers, Serial Pentium pro features.

UNIT IV :THE PENTIUM IV AND DUAL CORE MICRO PROCESSORS

Architecture, Special Registers and Pin Structures (brief treatment only).

UNIT V:OVERVIEW OF ARCHITECTURE AND MICROCONTROLLER RESOURCES

Architecture of a typical micro controller, Microcontroller resources, Resources in advanced and next generation microcontrollers.

8051 microcontroller, Internal and External memories, Counters and Timers, Synchronous serial communication, asynchronous serial communication, Interrupts.

UNIT VI : 8051 FAMILY MICROCONTROLLERS INSTRUCTION SET

Basic assembly language programming, Data transfer instructions, Data and Bit-manipulation instructions, Arithmetic instructions, Instructions for Logical operations on the test among the Registers, Internal RAM, and SFRs– Program flow control instructions, Interrupt control flow.

UNIT VII : REAL TIME CONTROL

Interrupts, Interrupt handling structure of an MCU, Interrupt Latency and Interrupt deadline, Multiple sources of the interrupts, Non-mask able interrupt sources, Enabling or disabling of the sources, Polling to determine the interrupt source and assignment of the priorities among them, Interrupt structure in Intel 8051.

TIMERS: Programmable Timers in the MCU's, Free running counter and real time control, Interrupt interval and density constraints.

UNIT VIII : 16/32 BIT MICROCONTROLLERS

16 bit Microcontrollers: Hardware, Memory map in Intel 80196 family MCU system, IO ports, Programmable Timers and High, speed outputs and input captures, Interrupts.

ARM 32 Bit Microcontrollers: Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set.

TEXTBOOKS:

1. Barry B. Brey, *The Intel Microprocessors,* 8th edition, Pearson Education, 2009.
2. A.K.Ray and K.M.Bhurchandi, *Advanced Microprocessor and Peripherals,* TMH.
3. Raj Kamal, *Microcontrollers Architecture, Programming, Interfacing and System Design,* Pearson Education, 2005.
4. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems,*PHI, 2000.

REFERENCES:

1. YU-Chang, Glenn A. Gibson, *Micro Computer Systems: The 8086/8088 Family Architecture, Programming and Design,* 2nd Edition, Pearson Education, 2007.
2. Douglas V. Hall, *Microprocessors and Interfacing*, Special Indian Edition, 2006.
3. A.V. Deshmuk, *Microcontrollers, Theory & Applications,* WTMH, 2005
4. John B. Peatman, *Design with PIC Microcontrollers,* Pearson Education, 2005.

IV B.Tech, II Semester
10BT80404: ADVANCED DIGITAL SIGNAL PROCESSING
(Elective - III)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PRE-REQUISITES: A course on Digital Signal Processing.

COURSE DESCRIPTION:

Design of Multirate filters; Estimation of Power spectrum; DSP Algorithms; Applications of DSP.

COURSE OUTCOMES:

On successful completion of this course the students will be able to

CO1.Gain fundamental knowledge in

- Filter banks
- Digital filter design
- Efficient power Spectral Estimation Techniques
- Multirate signal processing

CO2.Perform analysis of filter banks, LTI systems and digital filters.

CO3.Design and develop DSP algorithms and power spectral estimation methods.

CO4.Solve engineering problems in frequency domain and with advanced DSP algorithms.

UNIT I : MULTIRATE SIGNAL PROCESSING

Introduction to Multirate Signal Processing, Applications of multirate signal processing: Design of phase shifters, interfacing of digital systems with different sampling rates, implementation of narrow band low pass filters. Digital filter banks, two channel quadrature mirror filter bank, M-channel QMF bank.

UNIT II : LTI DISCRETE-TIME SYSTEMS IN THE TRANSFORM DOMAIN

Types of Linear-Phase transfer functions, Simple Digital Filters, Complementary Transfer Function, Inverse Systems, System Identification, Digital Two-Pairs, Algebraic Stability Test.

UNIT III : DIGITAL FILTER SRTUCTURE AND DESIGN

All Pass Filters, Tunable IIR Digital Filter, IIR Tapped Cascade Lattice Structures, FIR Cascaded Lattice Structures, Parallel All Pass Realization of IIR Transfer Functions, State Space Structures, Polyphase Structures, Digital Sine-Cosine Generator, Computational Complexity of Digital Filter Structures, Design of IIR Filter using pade' approximation, Least Square Design Methods, Design of Computationally Efficient FIR Filters.

UNIT IV : DSP ALGORITHMS

Fast DFT algorithms based on Index mapping, Sliding Discrete Fourier Transform, DFT Computation Over a narrow Frequency Band, Split Radix FFT, Linear filtering approach to Computation of DFT using Chirp Z-Transform.

UNIT V : POWER SPECTRAL ESTIMATION

Estimation of spectra from finite duration observation of signals, Non-parametric methods: Bartlett, Welch & Blackmann & Tukey methods.

UNIT VI : PARAMETRIC METHODS FOR POWER SPECTRUM ESTIMATION

Relation between Auto correlation & model parameters, Yule-Waker & Burg Methods, MA & ARMA models for power spectrum estimation.

UNIT VII : ANALYSIS OF FINITE WORDLENGTH EFFECTS IN FIXED-POINT DSP SYSTEMS

Fixed , Floating Point Arithmetic- ADC quantization noise &signal quality-Finite Wordlength effect in IIR digital Filters-Finite wordlength effects in FFT algorithms.

UNIT VIII : APPLICATIONS OF DIGITAL SIGNAL PROCESSING

Dual Tone Multi-frequency Signal Detection, Spectral Analysis of Sinusoidal Signals, Spectral Analysis of Non stationary Signals, Musial Sound Processing, Over Sampling A/D Converter, Over Sampling D/A Converter, Discrete-Time Analytic Signal Generation.

TEXT BOOKS:

1. Sanjit K Mitra, *Digital Signal Processing,* Tata McGraw Hill Publications, 3rd Ed., 2009.

2. J G Proakis, D G Manolokis, *Digital Signal Processing Principles, Algorithms and Applications,*PHI, 4th Ed., 2007.

REFERENCE BOOKS:

1.A V Oppenhiem, R W Schafer, *Discrete-Time Signal Processing,* Pearson Education, 2nd Ed., 2002.

2.Emmanuel C Ifeacher Barrie. W. Jervis, *DSP-A Practical Approach*,Pearson Education.

3. S. M .Kay, *Modern spectral Estimation techniques*, PHI, 1997.

IV B.Tech, II Semester
10BT81301: OPTIMAL CONTROL THEORY
(ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

Pre Requisite: Control Systems, Optimization techniques.

Course Description: optimal control problem; performance measures; Dynamic programming; calculus of variations, necessary conditions for optimal control; minimum time problems; methods of steepest decent; variation of extremals; gradient projection algorithm; stochastic optimal linear estimation.

Course Outcomes: After completion of the course the students are able to:

- CO1. Explain the principles behind the most standard algorithms for numerical solution of optimal control problems.
- CO2. Solve optimal control problems using standard algorithms.
- CO3. Select and apply appropriate optimal control techniques for a specific Problem.

UNIT – I : INTRODUCTION

Problem formulation – Mathematical model – Physical constraints – Performance measure Optimal control problem – Form of optimal control, State variable representation of systems, Solutions of state equations - linear systems, Problems.

UNIT – II : PERFORMANCE MEASURE

Performance measures for optimal control problem – Minimum time problems, Technical Control problems, minimum-control-effort problems, tracking problems, Select in a performance measure, the carrier landing of a JET AIRCRAFT.

UNIT – III : DYNAMIC PROGRAMMING-I

Optimal control law – Principle of optimality, Application of the Principle of the optimality to decision making, Routing problem, An optimal control system, Interpolation, recurrence relation of dynamic programming.

UNIT – IV : DYNAMIC PROGRAMMING-II

Computational procedure for solving control problems, Characteristics of dynamic programming solution, Continuous and discrete linear regulator problems, Hamilton – Jacobi – Bellman equation.

UNIT – V : CALCULUS OF VARIATIONS

Fundamental concepts, Functionals. Piecewise – smooth extremals Constrained extrema.

UNIT – VI : VARIATIONAL APPROACH TO OPTIMAL CONTROL PROBLEMS

Necessary conditions for optimal control – Pontryagin's minimum principle and state inequality constraints. Minimum time problems – Minimum control – effort problems. Singular intervals in optimal control problems.

UNIT – VII : NUMERICAL DETERMINATION OF OPTIMAL TRAJECTORIES

Two point boundary – Value problems. Methods of steepest decent, variation of extremals, Quasilinearization, Gradient projection algorithm.

UNIT – VIII : STOCHASTIC OPTIMAL LINEAR ESTIMATION

Introduction, Stochastic processes and linear systems, Optimal estimation for linear continues - time system and linear discrete – time systems, Stochastic optimal linear regulators.

TEXT BOOK:

1. Donald E. Kirk, *Optimal Control Theory: An Introduction*, Prentice-Hall networks series, 1970.

REFERENCES:

1. M. Gopal, *Modern Control System theory*, Revised 2nd Edition, New Age International Publishers
2. K. Ogata, *Modern Control Engineering*, 4th edition, LPE.
3. Anderson .B. D. O, Moore .J. B, *Optimal control linear Quadratic methods*, Prentice Hall of India, New Delhi, 1991.

IV B.Tech, II Semester
10BT81302 : ADAPTIVE CONTROL SYSTEMS
(ELECTIVE - IV)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

Pre Requisite: Control Systems.

Course Description: Concepts of adaptive control; Real-time parameter estimation; deterministic and stochastic self tuning regulators; Model reference adaptive system; Tuning.

Course Outcomes: After completion of the course the students are able to:

CO1. Acquire knowledge on different types of adaptive control systems and tuning processes.

CO2. Apply mathematical analysis to estimate the unknown parameters for adaptive process.

CO3. Design an adaptive controller to meet the specified conditions of the system.

CO4. Select and apply appropriate adaptive techniques for a specific problem.

UNIT I : INTRODUCTION
Concept of adaptive control, definitions, types of adaptivity, effects of process variation, adaptive systems, adaptive control problem, learning in adaptive systems.

UNIT II : REAL TIME PARAMETER ESTIMATION
Introduction to parameter estimation, least squares and regression models, least squares estimation, recursive computation, continuous time models. Estimation parameters in dynamical systems, finite impulse response models, transfer function models. Experimental conditions.

UNIT III : DETERMINISTIC SELF TUNING REGULATORS
Introduction, block diagram, pole placement design, indirect self tuning regulators, continuous time self tuners, direct self tuning regulators.

UNIT IV : STOCHASTIC SELF TUNING REGULATORS
Design of minimum variance and moving average controllers - minimum variance control, non-minimum phase system, moving average controller, LQG control, stochastic self tuning regulators, unification of direct self tuning regulators, linear quadratic STR.

UNIT V : STABILITY ANALYSIS
Introduction to stability, definitions, theorems, lyapunov theory on stability, bounded input - bounded output stability.

UNIT VI : MODEL REFERENCE ADAPTIVE SYSTEMS
Introduction - The MIT rules, Determination of Adaptation Gain, Design of MRAS using Lyapunov Theory, Output Feedback, Relations between MRAS and STR.

UNIT VII : AUTO-TUNING
Introduction, PID control, auto-tuning techniques, transient response methods, methods based on relay feedback, relay oscillations.

UNIT VIII : GAIN SCHEDULING

Introduction, the principle, design of gain, scheduling controllers, nonlinear transformations, applications, ship steering, pH control

TEXT BOOKS:

1. Karl.J.Astrom and Bjorn Wittenmark, *Adaptive Control*, Pearson Education, 2003.

REFERENCES:

1. Misthkin and Braun, *Adaptive Control Systems*, McGraw Hill

III B.Tech. I Semester

10BT51501: SYSTEM SOFTWARE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Micro-processor and Interfacing"

COURSE DESCRIPTION: PC hardware, Addressing formats; Loop and conditional jump instructions and operations; String and arithmetic operation, Interrupts 10H and 21h; Macros, Intra and Inter segment calls; Macro expansion, Two pass and Single pass Algorithms; Design of assemblers; Loader schemes; Text Editors, Debugging Editors;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire knowledge in as Macros, Assemblers, Loaders, Linkers and Text editors.
2. Design System Software programs using Assembly Language.
3. Demonstrate skills in programming assemblers, loaders and linkers.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO PC ARCHITECTURE

PC Hardware, Segments and Addressing, Registers, Assembly Language Basics, Machine Addressing, Special DEBUG features, Data Definition Directives, Addressing Formats, COM Programs.

UNIT - II: PROGRAM LOGIC AND CONTROL

JMP, LOOP and Conditional Jump Instructions, Boolean operations, Shifting, Rotating.

UNIT - III: KEYBOARD AND SCREEN PROCESSING

String Operations, Arithmetic Operations and Table Processing, Searching, Sorting.

ADVANCED SCREEN AND KEYBOARD PROCESSING: BIOS Interrupt 10H for graphics and text, DOS Interrupt 21H .

UNIT - IV: MACROS

Introduction, Simple Macro definition, Using Parameters and Macros, Using Comments in Macros, Nested Macros and Macro Directives, Intra-segment and Inter-segment Calls, Passing Parameters.

UNIT - V: MACRO PROCESSORS

Macro Instructions, Features of a Macro Facility: Macro Instruction Arguments, Conditional Macro Expansion, Macro Calls within Macros, Macro Instructions defining Macros, Implementation of a Restricted Facility: A Two-Pass Algorithm, A Single-Pass Algorithm

UNIT - VI: ASSEMBLERS

General Design Procedure, Design of Assembler: Statement of Problem, Data Structure, Format of Databases, Algorithm, Look for Modularity, Single Pass Assembler and Two Pass Assembler.

III B.Tech. I Semester

10BT51502: OBJECT ORIENTED SOFTWARE ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Object Oriented Programming"

COURSE DESCRIPTION: Software Myths, Life cycle models; Product Metrics, Project Management; Building blocks of UML; Requirement Elicitation and Modeling; Architecture design and styles, Object Oriented design Process; Testing strategies for conventional and modern software; Risk management; Software quality assurance;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Gain knowledge in :
   i) Requirement engineering
   ii) Design engineering and
   iii) Testing
2. Analyze performance and metrics for processes and products.
3. Apply Functional knowledge in UML for design and development of software.
4. Demonstrate Competence in quality assurance and reliability of software products.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION TO SOFTWARE ENGINEERING

The evolving role of software, Changing Nature of Software, Software myths, Software engineering- A layered technology, a process framework.

Software Life Cycle Models: Waterfall, RAD, Spiral, Open-source, Agile process, CMM levels.

UNIT – II: PLANNING & ESTIMATION

Product metrics, Estimation- LOC, FP, COCOMO models.

Project Management: Planning, Scheduling, Tracking.

UNIT – III: MODELING WITH UML

Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams.

UNIT – IV: REQUIREMENTS ENGINEERING

Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

Building The Analysis Model: Requirement Analysis, Analysis Modeling Analysis, Data Modeling Concepts, Object Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Class-Based Modeling, Creating a behavioral Modeling.

UNIT – V: DESIGN ENGINEERING

Design process and Design quality, Design concepts, the design model.

Creating An Architectural Design**:** software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object- Oriented design process, Design evolution.

III B.Tech. II Semester

10BT61501: MODELING AND SIMULATION

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on "Engineering Mathematics, Optimization Techniques"

COURSE DESCRIPTION: An overview of network Modeling; commonly used distributions, Regression Models; Queuing Network Analysis; Bounds on Performance, Hierarchical modeling; Monitors; principles of factorial design; Simulation Software; Simulation of Computer Systems;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Gain knowledge in :
   - i) summarizing the selection and characteristic of workload
   - ii) Designing of monitors
   - iii) Experimental designing
   - iv) Concepts of simulation
2. Analyze data and functional performance of the system and simulate random numbers.
3. Design, develop, verify and validate the models for the systems.
4. problems solving skills related to real time computing systems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION

A Systematic approach to performance Evaluation, Selecting an Evaluation Technique, Selecting performance Metrics, Commonly used Performance Metrics, Classification of Performance Metrics.

Commonly Used Distributions: Bernoulli distribution, Binomial distribution, Beta, Chi-Square, Erlang, Exponential, F ,Geometric, Gamma, normal, poisson, Pascal, uniform, weibull distributions, Relationship among distributions.

UNIT-II: INTRODUCTION TO QUEUEING THEORY:

Queueing Notation, Rules for all Queues, little's law, Types of stochastic processes, Birth-Death processes,M/M/1 Queue ,M/M/m Queue, M/M/m /B Queues with finite buffers, Results for other Queueing systems;

Open and Closed Queueing Networks, Product form Networks, Queueing Network Models of computer System.

Operational Laws: utilization law, Forced flow law, little's law, general response time law, intractive response time law, Bottleneck analysis

UNIT-III:

Types of work loads: Addition Instruction, Instruction metrics, kernels, Synthetic Programs, Application Benchmarks, Popular Benchmarks.

Work load selection: Services exercised, Level of detail, representativeness, Timeliness, other considerations.

Workload Characterization Techniques: Terminology, Averaging, specifying dispersion, single parameter histograms, multi parameter histograms, principle –Component analysis, markov models, Clustering

UNIT-IV:

Monitors: Monitor terminology, classification, software, hardware monitors, Software versus Hardware monitors, Firmware and hybrid monitors, distributed system monitors, program execution monitors, techniques for improving program performance, accounting logs, analysis and inter presentation of accounting log data.

UNIT-V:

Summarizing measured data: Basic probabilities and statistics concepts, summarizing data by a single number, selecting among the mean, median, mode, geometric mean, harmonic mean, mean of a ratio, summarizing variability, selecting the index of dispersion, determining distribution of data.

IV B.Tech. I Semester

10BT71501: **NETWORK PROGRAMMING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION: Unix Standards, Protocol Usage by common internet application; Elementary TCP Sockets; Handling server process termination, crashing and rebooting; IPV6 socket options; Interface with UDP; Function and IPV6 support; IPC creating and opening channels, permissions; Terminal Modes, Remote login overview;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Gain knowledge in concepts of sockets, inter process communication and remote login.
2. Analyze various networking protocols such as TCP and UDP.
3. Acquire skills to design and develop protocols for networks.
4. Apply programming skills to solve problems relevant to client server architectures.

UNIT-I: INTRODUCTION TO NETWORK PROGRAMMING

OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

UNIT-II: SOCKETS

Address structures, value result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets -Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-III: TCP CLIENT SERVER

Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

UNIT-IV: I/O MULTIPLEXING AND SOCKET OPTIONS

I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket options.

UNIT-V: ELEMENTARY UDP SOCKETS

Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

UNIT-VI: ELEMENTARY NAME AND ADDRESS CONVERSIONS

DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

UNIT-VII: IPC

Introduction, Pipes, popen and pclose functions, FIFO's, streams and messages, System V IPC: IPC_Perm Structure, IPC Permissions, Creating and Opening IPC Channels, Message queues (msgget, msgsnd, msgrcv, msgctl Functions), Shared Memory (shmget, shmat, shmdt, shmctl Functions).

UNIT-VIII: **REMOTE LOGIN**

Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC, Transparency Issues.

TEXT BOOKS:

1. W.Richard Stevens, UNIX Network Programming IPC, Vol. II, 2nd Edition, Pearson Education. Asia.
2. W.Richard Stevens, UNIX Network Programming, Vol. I, Sockets API, 2nd Edition, Pearson Education. Asia.

REFERNCE BOOKS:

1. T CHAN, UNIX SYSTEMS PROGRAMMING USING C++,3rd Edition, PHI.
2. GRAHAM GLASS, KING ABLES, UNIX for programmers and Users, 3rd Edition, Pearson Education.
3. M J Rochkind, Advanced UNIX programming, 2nd Edition, Pearson Education

IV B.Tech. I Semester

10BT71502: SOFT COMPUTING TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: Courses on "Discrete Mathematical structures, Theory of Computation"

COURSE DESCRIPTION: Fuzzy Logic, Genetic Algorithms; Artificial Neurons, Neural Network Architectures; Architecture of back propagation networks; Adaptive Resonance Theory; Fuzzy Vs Crisp logic; Fuzzy rule based systems; Genetic algorithm applications;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire knowledge of principles and techniques of soft computing such as neural networks, fuzzy-logic and genetic algorithms.
2. Analyze applications of back propagation networks and associative memory.
3. Unravel Issues using fuzzy logic and genetic modeling.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO AI:

Neural Networks, Fuzzy Logic, Genetic Algorithms. Derivative based optimization: Introduction, Descent Methods, Newton's Methods, Step size determination, Non Linear least squares problems, Derivative free optimization: Introduction, Genetic Algorithms, Simulated Analysis, Randoms search, Down Hill Simplex Search.

UNIT-II: FUNDAMENTALS OF NEURAL NETWORKS

Basic Concepts of Neural Networks, Human Brain, Model of an Artificial Neurons, Neural Network architectures, Characteristics of Neural Network Architecture, Early Neural Network Architecture.

UNIT-III: BACK PROPAGATION NETWORKS

Architecture of a Back Propagation Networks, Back Propagation Learning, Illustration, Applications. Effect of tuning Parameters of Back Propagation Neural Networks, Selection of Various Parameters in BPN, Variations of Standard Back Propagation Algorithm.

UNIT-IV: ASSOCIATIVE MEMORY

Auto Correlators, Hetero Correlators, Multiple Traning Encoding Strategy, Exponential BAM, Associative Memory for Real Coded Pattern pairs, Applications, Adaptive Reasonance Theory, ART1, ART2, Applications.

UNIT-V: FUZZY THEORY

Fuzzy versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations.

UNIT-VI: FUZZY SYSTEMS

Crisp Logic, Pridicate Logic, Fuzzy Logic, Fuzzy Rule Based System, Defuzzisication Methods, Applications.

IV B.Tech. I Semester

10BT71503: ARTIFICIAL INTELLIGENCE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Discrete Mathematical structures, Theory of Computation"

COURSE DESCRIPTION: AI Problems; Search Exploration; Effective Propositional, first order Inference; Truth maintenance systems; Acting under Uncertainty; forms of learning; Fuzzy inference processing;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Analyze and establish logic for design and development of intelligent systems.
2. Relate Knowledge representation, reasoning, learning and searching.
3. Investigate real time conceptual problems using statistical learning methods.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION

The AI Problems, The Underlying Assumption, The Levels of the Model, Criteria of Success, Some General References, One Final Word and Beyond. Problems, Problem Spaces, and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs.

UNIT-II: PROBLEM-SOLVING

Uninformed Search Strategies, Avoiding Repeated States. Informed Search and Exploration: Informed (Heuristic) Search Strategies, Heuristic Functions, Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Backtracking Search for CSPs.

UNIT-III: KNOWLEDGE AND REASONING

Logical Agents, Knowledge–Based Agents, The Wumpus World, Logic, Propositional Logic a Very Simple Logic, Reasoning Patterns in Propositional Logic, Effective Propositional Inference, Agents Based on Propositional Logic.

UNIT-IV: FIRST-ORDER LOGIC

Representation Revisited, Syntax and Semantic of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT-V: KNOWLEDGE REPRESENTATION

Ontological Engineering, Categories and Objects, Actions, Situations, and Events, Mental Events and Mental Objects, The Internet Shopping World, Reasoning Systems for Categories, Reasoning with Default Information, Truth Maintenance Systems.

UNIT-VI: UNCERTAIN KNOWLEDGE AND REASONING

Uncertainty, Acting Under Uncertainty, Basic Probability Notation, The Axioms of Probability, Inference Using Full Joint Distributions, Independence, Bayes' Rule and its Use.

IV B.Tech. I Semester

10BT71504: NETWORK MANAGEMENT

(ELECTIVE – I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

PREREQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION: Communication protocols and standards; Network management standards; versions of SNMP; Internet Traffic network Management Tools; Telecommunication Network Management architecture; Distributed Network Management;

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Gain knowledge in network management, remote monitoring, broadband networks and telecommunication networks.
2. Acquire Skills to analyze internet traffic network management, SNMP model.
3. Apply SNMP protocol for computer network management.

DETAILED SYLLABUS:

UNIT-I: DATA COMMUNICATIONS AND NETWORK MANAGEMENT OVERVIEW

Analogy of Telephone Network Management, Communication Protocols and Standards, Case Histories on Networking and Management, Network Management Functions, Network and System Management.

UNIT-II: BASIC FOUNDATIONS

Standards, Models, and Language, Network Management Standards, Network Management Models, Organization Model, Information Model, Communication Model, Functional Model, Network Management Applications, Abstract Syntax Notation One: ASN.1, Encoding Structure.

UNIT-III: SNMPV1 NETWORK MANAGEMENT

History of SNMP Management, Internet Organizations and Standards, SNMP Model, Organization and Information Models, Communication and Functional Models.

UNIT-IV: SNMPV2 NETWORK MANAGEMENT

SNMPv2, Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, SNMPv2 Management Information Base, SNMPv2 Protocol.

UNIT-V: SNMPV3 NETWORK MANAGEMENT

SNMPv3, SNMPv3 Key Features, SNMPv3 Documentation Architecture, SNMPv3 Applications, SNMPv3 Management Information Base, SNMPv3 User-based Security Model, Access Control.

III B.Tech. I Semester

10BT50111 : **COMPUTER AIDED BUILDING DRAWING**

Internal Marks	External Marks	Total	L T P C
25	50	75	- - 3 2

Prerequisites: - Building materials and Concrete Technology

Course Description: Loading bearing walls; RCC framed structures; Industrial buildings; views on one and two storey buildings.

Course Objectives:

- To introduce basics concepts of Auto CAD
- To develop skills in drawing plan, elevation and cross sectional views
- To analyse the structures and find the dimensions of the members.
- To certify the drawings.

Course Outcomes:

- Draw plan, elevation and cross sectional views of a structure.
- Design the buildings using Auto CAD.
- Recommended various roof trusses for industrial building.
- Work individually and as a member in multidisciplinary seasons.

SOFTWARE: AUTOCAD

LIST OF EXERCISES

1. Buildings with load bearing walls (Flat and pitched roof) – Including details of doors and windows
2. RCC framed structures
3. Industrial buildings – North light roof trusses
4. Perspective view of one and two storey buildings

TEXT BOOKS

1. Varma B.P., *Civil Engineering Drawing and House Planning,* 10th Edition, Khanna Publishers, Delhi, 1992.
2. Balagopal and T.S. Prabhu, *Building Drawing and Detailing,* Spades Publishers, Calicut, 1987.

REFERENCES

1. Shah, M.G., *Building Drawing,* Tata McGraw-Hill, New Delhi, 2007.
2. Kumaraswamy N. and Kameswara Rao A., *Building Planning and Drawing,* 4th Edition, Charotar Publishing, 2010.
3. Kale and Patki, Shah, *Building Drawing with Integrated Approach To Built Environment,* Tata McGraw-Hill, New Delhi, 2002.

III B.Tech. I Semester

10BT50112 : **ENGINEERING GEOLOGY LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Engineering geology

Course Description:
Study of rocks and minerals; geological maps; problems on structural geology

Course Objectives:

- To introduce the basic knowledge of minerals and rocks
- To design a proper foundation to civil structures.
- To analyze the suitability of various rocks for construction
- To identify the feasible location for dams, tunnels, bridges and roads

Course Outcomes:

After the completion of this course, a successful student is able to :

- Apply the knowledge of physical properties of minerals and rocks to the suitability of the construction materials.
- Analyze the geological maps of the construction area.
- Conduct investigations with resistivity meter.
- Explain the failures of civil engineering structures due to geological drawbacks.
- Propose suitable methods for mining and mineral exploration.
- Communicate effectively for the management of geological resources.
- Function effectively as mining engineer in a team and as an individual.

LIST OF EXERCISES

1. Study of physical properties and identification of rock forming minerals.
2. Study of physical properties and identification of ore forming minerals.
3. Megascopic identification of common igneous rocks.
4. Megascopic identification of common sedimentary rocks.
5. Megascopic identification of common metamorphic rocks.
6. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
7. Simple structural geology problems.

III B.Tech. II Semester

10BT60111 : **GEOTECHNICAL ENGINEERING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Soil Mechanics

Course Description: Tests for Atterberg's limits; determination of field density; grain size analysis, permeability tests, compaction test, relative density, CBR test, consolidation test, unconfined compression test, triaxial test, direct shear test, vane shear test.

Course Objectives:

- To give the knowledge of working principles of various laboratory tests on soils.
- To provide hands on experience in conducting experiments on different soils.
- Analysis the experimental results to deduce inferences.
- Classify the soils and establish index and engineering properties of soil.

Course Outcomes:

- Classify the given soil and determine its properties.
- Analyze and interpret engineering behavior of soils.
- Recommend suitability of soil for a civil engineering construction.
- Choose a foundation based on soil condition.
- Recommend suitable ground improvement method based on soil type and application.
- Give solutions environmental friendly and economically viable.

LIST OF EXPERIMENTS

1. Tests for Atterberg's limits
2. Determination of field density - core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil - constant head test and variable head test
5. Compaction test
6. Relative density test
7. CBR test
8. Consolidation test
9. Unconfined compression test
10. Tri-axial compression test
11. Direct shear test.
12. Vane shear test **II**

III B.Tech. II Semester

10BT60112 : **ENVIRONMENTAL ENGINEERING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Environmental Engineering-I

Course Objectives:

- To understand the concepts of analysis of water and waste water samples.
- To develop skills in identifying different characteristics of water and waste water.
- To apply different methods in analyzing the characteristics of water.
- To familiar the importance of impurities present in water.

Course Outcomes:

- Test water quality and asses waste water characteristics using the principles of treatment method.
- Acquire knowledge on the quality standards.
- Estimate the quantity of chemicals required to treat the water and waste water.
- Recommend for the suitability of water for drinking purposes.
- Use different techniques in analyzing the water.
- Improve the quality of water by using different chemical treatment methods.
- Demonstrate the knowledge of water treatment methods for safety of society.
- Work efficiently in groups and individually.

LIST OF EXPERIMENTS

1. Determination of pH and turbidity
2. Determination of conductivity and total dissolved solids.
3. Determination of alkalinity/acidity.
4. Determination of chlorides.
5. Determination and estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
7. Determination of dissolved oxygen.
8. Determination of nitrogen.
9. Determination of total phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D
12. Determination of optimum coagulant dose.
13. Determination of chlorine demand.
14. Presumptive E - Coli test.

IV B.Tech. I Semester

10BT70115: GIS AND COMPUTER AIDED DESIGN AND DETAILING LAB

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Remote Sensing and GIS, RCCS, AutoCAD and Staad Pro

Course Description: Study of thematic maps; GIS application on water resources and transportation engineering

Course Objectives:

- To introduce the basic concepts and working knowledge of various components of rapidly expanding fields of R.S & GIS.
  To apply GIS techniques for traffic and water management
- To analyze the data using Geospatial techniques.
- To identify the potential applications to environmental and sustainability issues.

Course Outcomes:

After completion of this course, a student is able to :

- Apply the knowledge of aerial photographs, satellite imagery to civil engineering applications.
- Analyze the Remote sensing and GIS techniques to generate the geographical information for natural resources.
- Conduct the survey with GPS and satellite imagery.
- Give recommendations for better water resource management.
- Communicate effectively for the management of water resources.

LIST OF EXCERCISES

1. Digitization of map/toposheet
2. Creation of thematic maps
3. Study of features estimation
4. Developing digital elevation model
5. Simple applications of GIS in water resources engineering and transportation engineering

TEXT BOOKS

1. Chor Pang Lo. Albert, K.W. Yeung, *Concept and Techniques of GIS,* PHI, 2007.
2. Krishnamoorthy, C.S and Rajeev. S., *Computer Aided Design,* Narosa Publishing House, New Delhi, 2004.

REFERENCES

1. Krishnamurthy. D.,*Structural Design and Drawing – Vol. II and Vol.III,* CBS Publishers and Distributors, Delhi, 2005.
2. Groover, M.P. and Zimmers, E.W. Jr., *CAD/CAM: Computer Aided Design and Manufacturing,* Prentice Hall of India Ltd, New Delhi, 1993.
3. Burrough. P. A, *Principles of GIS for Land Resources Assessment,* Oxford University Publication, 2000.
4. Clarke. K.C., *Getting Started with Geographic Information Systems,* 3rd Edition, Prentice Hall of India Ltd, New Delhi, 2001.
5. *SP-16 – 1980: Design Aids for Reinforced Concrete,* Bureau of Indian Standards, New Delhi.
6. *SP-34 – 1987: Hand Book on Concrete Reinforcement and Detailing,* Bureau of Indian Standards, New Delhi.

IV B.Tech. I Semester

10BT70116: **CONCRETE AND HIGHWAY ENGINEERING LAB**

Internal Marks	External Marks	Total	L	T	P	C
25	50	75	-	-	3	2

Prerequisites: Transportation engineering, building material

Course description: The course will provide knowledge and skills of road/highway material testing to those in the field of road construction or who intend to join this field of specialization.

Course Objectives:

- To enable students to understand the Road pavement structures or layers,
- To analyse the material properties, vehicle loading criteria and to demonstrate the design and construction of road pavements.
- To understand Environmental and ecological context in which sustainable highway engineering operates.
- To expose the interdisciplinary approaches in solving engineering problems

Course Outcomes:

After completion of this course, a student is able to:

- Perform aggregate testing related to road and highway construction.
- Select the appropriate materials for use in different road layers.
- Evaluate the quality and performance of unbound and bound road materials.
- Understand the strength of the Road/concrete materials.

LIST OF EXPERIMENTS

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

7. Penetration test
8. Ductility test
9. Softening point test
10. Flash and fire point tests

III. CEMENT AND CONCRETE

11. Normal consistency and fineness of cement
12. Initial setting time and final setting time of cement.
13. Specific gravity and soundness of cement
14. Compressive strength of cement
15. Workability test on concrete by Compaction factor, Slump and Vee-bee
16. Young's modulus and compressive strength of concrete
17. Bulking of sand

Non-Destructive testing on concrete (for demonstration)

III B.Tech. I Semester

10BT50511: MICROPROCESSORS AND INTERFACING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Nil.

COURSE DESCRIPTION: Simple Assembly Language Programs-Arithmetic Operations, Conversions of Number Systems, Sorting etc.; Interfacing of Microprocessors with external peripheral devices - Keyboard, Seven Segment Display, Stepper Motor, Logic Gate Controller and so on through Assembly Language Programming; and the basic programming on 8051 Microcontroller.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Understand the architecture, instruction set, addressing modes of intel 8086 microprocessor.
2. Ability to interface ADC, DAC, stepper motor, keyboard, seven segment display to microprocessor.
3. Develop solutions to simple applications using intel 8086 assembly language programming.
4. Analyze the issues in interfacing stepper motor and traffic light controller.

I. Microprocessor 8086:

1. Introduction to MDS.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing:

1. 8259 – Interrupt Controller: Generate an interrupt using 8259.
2. 8279 – Keyboard Display: Write a small program to display a string of characters.
3. 8255 – PPI: Interfacing DAC, Stepper Motor, ADC.
4. 8251 – USART: Write a program in ALP to establish Communication between two processors.

III. Microcontroller 8051

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

III B.Tech. I Semester

10BT50512: DATABASE MANAGEMENT SYSTEMS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Nil.

COURSE DESCRIPTION: Database Design, Storage and Retrieval Using SQL and PL/SQL; DDL; DML; Case Studies on Normalization; Database security and integrity-triggers and constraints.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Design and implement a database schema for the sales database.
2. Apply normalization on sales database.
3. Analyze design and evaluate the databases using SQL DML/DDL commands.
4. Develop solutions to database problems using programming PL/SQL including stored procedures, stored functions, cursors and triggers.

DESCRIPTION OF SALES DATABASE

ABC is a company operating in the country with a chain of shopping centers in various cities. Everyday large numbers of items are sold in different shopping centers. The Sales database comprises of various tables like CUST, PROD, SALES_DETAIL, STATE_NAME with the following schemas.

CUST TABLE

Name	Type	Remark
CID	VARCHAR2(6)	PRIMARY KEY
CNAME	VARCHAR2(10)	
CCITY	VARCHAR2(8)	

PROD TABLE

Name	Type	Remark
PID	VARCHAR2(6)	PRIMARY KEY
PNAME	VARCHAR2(6)	
PCOST	NUMBER(4,2)	
PPROFIT	NUMBER(3)	

SALES_DETAIL

Name	Type	Remark
CID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
PID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
SALE	NUMBER(3)	
SALEDT	DATE	COMPOSITE PRIMARY KEY

STATE_NAME

Name	Type	Remark
CCITY	VARCHAR2(8)	PRIMARY KEY
STATE	VARCHAR2(15)	

1. ER MODEL

Draw an ER Model indicating many to many relationship between CUST vs PROD. Show the Cardinality Ratio between PROD and SALES_DETAIL is one-to-many because one product can be sold multiple times. Similarly show the Cardinality Ratio between CUST and SALES_DETAIL is one-to-many because one customer can purchase many products. Indicate CID# and PID# are unique in CUST and PROD entity respectively, where as CID and PID in SALE_DETAIL entity may occur many times.

Represent the ER Model in Tabular Form.

2. NORMALIZATION

In the above relations the following Functional Dependencies exist:

CID → CNAME, CCITY, STATE

PID → PNAME, PCOST, PPROFIT

CID, PID, SALEDT → SALE

CID#	CNAME	CCITY	STATE	PID#	PNAME	PCOST	PROFIT	SALE	SALEDT#
C1	RAVI	HYD	AP	P1	CD	10		5	14-JUL-10
				P3	DVD	20	10	2	14-JUL-10
				P3	DVD	20	10	3	20-AUG-09

Normalize the above table into 1NF, 2NF and 3NF. And handle Insert, Delete and Update anamolies.

3. DATA RETRIEVAL

a) Write a query to display all columns of CUST table.
b) Write a query to display pname of all records. Sort all records by pname. (use order by clause)
c) Write a query to display cname and ccity of all records. Sort by ccity in descending order.
d) Write a query to display cname, ccity who lives in mysore.
e) Write a query to display cname, pname, sale, saledt for all customers.
f) Write a query to display cname who have purchased Pen.
g) Write a query to display saledt and total sale on the date labeled as sale of all items sold after 01-sep-2010.

h) Write a query to display saledt and total sale on the date labeled as sale of all items other than DVD.
i) Write a query to display cname and ccity of all customers who live in Kolkata or Chennai.

4. USE OF DISTINCT, BETWEEN, IN CLAUSE, LIKE OPERATOR, DUAL

a) Write a query to display the pname and pcost of all the customers where pcost lies between 5 and 25.
b) Find the product ids in sale_detail table(eliminating duplicates).
c) Write a query to display distinct customer id where product id is p3 or sale date is '18-mar-2011'.
d) Write a query to display cname, pid and saledt of those customers whose cid is in c1 or c2 or c4 or c5.
e) Write a query to display cname, pid, saledt of those customers whose pid is p3 or sale date is '20-dec-2009'.
f) Write a query to display system date.
g) Write a query to display all records of prod table in which first and third character of pname is any character and second character is 'E'.
h) Write a query to display all cname which includes two 'A' in the name.

5. CONSTRAINTS

a) Implement table level and Column level constraints like NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK.

6. SINGLE ROW FUNCTIONS: DATE FUNCTION

a) Write a query to display the system date by rounding it to next month.
b) Write a query to display the system date by rounding it to next year.
c) Write a query to display the last date of the system date.
d) Write a query to display the next date of system date which is Friday.
e) Write a query to display sale date and date after 02 months from sale date.

f) Write a query to display system date, sale date and months between two dates.
g) Write a query to display the greatest date between sale date and system date, name it as BIG, also display sale date and SYSDATE.
h) Write a query to display the least date between sale date and system date name it as SMALL, also display sale date and SYSDATE.

7. SINGLE ROW FUNCTIONS: NUMERIC AND CHARACTER FUNCTION

a) Write a query to display the product name along with the rounded value of product cost for product name is "Pencil".
b) Write a query to display product cost along with MOD value if divided by 5.
c) Write a query to display cname in uppercase, lowercase, titlecase from cust table where customer name is "rohan".
d) Write a query to display all concatenated value of cname, ccity by converting cname into titlecase and ccity into uppercase.
e) Write a query to display the first 3 characters of cname.
f) Write a query to display the position of 'M' in the cname of the customer whose name is "SAMHITA".
g) Write a query to display the length of all customer names.
h) PAD # character in left of product cost to a total width of 5 character position.

8. GROUP FUNCTIONS AND SET FUNCTIONS

a) Write a query to display the total count of customer.
b) Write a query to display the minimum cost of product.
c) Write a query to display average value of product cost rounded to 2nd decimal places.
d) Write a query to display product name with total sale detail in descending order.
e) Write a query to display product name, sale date and total amount collected for the product.
f) Write a query to display sale date and total sale date wise which was sold after "14-jul-08".

g) Write a query to display the customer name who belongs to those places whose name is having I or P.
h) Write a query to display customer name who belongs to a city whose name contains characters 'C' and whose name contains character 'A'.
i) Write a query to display the customer name who does not belong to PUNE.

9. PL/SQL

a) Write a PL/SQL program to find largest number among three. (Hint: Use Conditional Statement)
b) Write a PL/SQL program to display the sum of numbers from 1 to N using for loop, loop…end and while…loop.

10. SQL CURSOR

a) Write a PL/SQL program to display the costliest and cheapest product in PROD table.
b) Write a PL/SQL program which will accept PID and display PID and its total sale value i.e. sum.

11. FUNCTIONS

a) Write a function that accepts two numbers A and B and performs the following operations.
   i. Addition
   ii. Subtraction
   iii. Multiplication
   iv. Division
b) Write a function that accepts to find the maximum PCOST in PROD table.

12. PROCEDURES

a) Write a procedure that accepts two numbers A and B, add them and print.
b) Write procedures to demonstrate IN, IN OUT and OUT parameter.

13. TRIGGER

a) Develop a PL/SQL program using BEFORE and AFTER triggers.

14. CURSOR

a) Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

III B.Tech. II Semester

10BT61211: OBJECT ORIENTED ANALYSIS AND DESIGN LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Nil

COURSE DESCRIPTION: Modeling case studies using Visual paradigm tool in use case view, logical view, component view and deployment view.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. To apply knowledge of UML to design an object oriented system, which is implemented in an object oriented language.
2. Develop and apply analysis models for solving real world applications like ATM, library information system, POS system online ticket reservation, student registration system.
3. Model the requirements with use cases.
4. Analyze the dynamic behaviour and structure of the design.
5. Engage in life-long learning through practice and design.

Case studies given below should be Modeled using Rational Rose tool in different views i.e Use case view, logical view, component view, Deployment view.

CASE STUDY 1: LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned by the library that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 2: A POINT OF SALE (POS) SYSTEM

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client – side terminals and interfaces such as browser, PDA's, touch – screens.

CASE STUDY 3: AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 4: ONLINE TICKET RESERVATION FOR RAILWAYS
Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

CASE STUDY 5: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY
Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.

The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview.

There may be different rounds for interview like the written test, technical interview, HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

CASE STUDY 6: DESIGN A STUDENT REGISTRATION SYSTEM

Problem Statement:

Each student has access to his or her course and grade information only and must be authenticated prior to viewing or updating the information. A course instructor will use the system to view the list of courses he or she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching, and record final grades for each student in the course(s). TA assignments will also be viewable through this system. Instructors must also be authenticated prior to viewing or updating any information.

CASE STUDY 7: ONLINE AUCTION SALES

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

REFERENCE BOOKS:

1. Grady Booch, James Rum Baugh, Ivar Jacobson, *The Unified Modeling Language User Guide*, 2 ed, Pearson Education, 2009
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, *UML 2 Toolkit*, WILEY-Dreamtech India Pvt. Ltd., 2003.
3. Meilir Page-Jones, *Fundamentals of Object Oriented Design in UML*, Pearson Education, 2000.
4. Pascal Roques, *Modeling Software Systems Using UML2*, WILEY-Dreamtech India Pvt. Ltd, 2004.
5. Craig Larman, *An introduction to Object – Oriented Analysis and Design and Unified Process Applying UML and Patterns*, Pearson Education, 2002.

III B.Tech. II Semester

10BT60511: UNIX PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Implementation of various Unix commands; Shell Scripting; Inter process Communication; System Calls; File Handling operations, Simulating basic Unix Commands like cat, cp,head,tail,mv & nl in C language.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Design and implement common system automation tasks using shell scripts.
2. Apply unix commands to create access and manipulate directories and file permissions.
3. Develop code in C to unix commands like cat, head, mv, cp,tail,nl.
4. Able to implement IPC techniques like shared memory, message queue, pipe, FIFO.

List of Practicals:

1. Study and Practice on various commands like man, passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, w.

2. Study and Practice on various commands like cat, tail, head , sort, nl, uniq, grep, egrep,fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.

3. a) Write a Shell Program to print all .txt files and .c files.
   b) Write a Shell program to move a set of files to a specified directory.
   c) Write a Shell program to display all the users who are currently logged in after a specified time.
   d) Write a Shell Program to wish the user based on the login time.

4. a) Write a Shell program to pass a message to a group of members, individual member and all.
   b) Write a Shell program to count the number of words in a file.
   c) Write a Shell program to calculate the factorial of a given number.
   d) Write a Shell program to generate Fibonacci series.

5. a) Write a Shell program to print all prime numbers between 1 and n.
   b) Write a Shell program to count no of lines in a text file which starts with a specified letter (Use grep command).

6. a) Simulate **cat** command. b) Simulate **cp** command.

7. a) Simulate **head** command. b) Simulate **tail** command.

8 a) Simulate **mv** command. b) Simulate **nl** command.

9 Write a program to handle the signals like **SIGINT, SIGQUIT, SIGFPE**.

10 Implement the following IPC forms
a) **FIFO** b) **PIPE**

11 Implement **message queue** form of IPC.

12 Implement **shared memory** form of IPC.

13 Write a Socket program to print system date and time (Using TCP/IP).

IV B.Tech. I Semester

10BT70511: SOFTWARE TESTING TECHNIQUES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on "C Programming".

COURSE DESCRIPTION: Executing test cases in unit testing, integration testing, system testing, user acceptence testing and performing functional testing by using automated testing tools like win runner, QTP. Load runner is used for performance testing.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge in designing and testing of real world projects.
2. Design and conduct a software test process for a software testing project.
3. Develops solution by using software testing methods and tools for testing projects.
4. Analyze the errors in the software project.
5. Engage in life long learning by incorporating the best design practices.

List of Practicals:

1. Generate meaningful Unit test cases for the Project module-wise and test them for defects, Identify the defects from the code and correct them. Try Identify the various unit test metrics studied already to identify module stability. Fill the unit test report supplied by the instructor.

2. Generate meaningful Integration test cases for the Project and test them for defects, Identify the defects and correct them. Try Identify the various Integration test metrics studied already to identify module stability. Fill the Integration test report supplied by the instructor.

3. Generate meaningful System test cases for the Project and test them for defects, Identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.

4. Generate meaningful User Acceptance cases for the Project and test them for defects, Identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.

5. Test the supplied project/Application through testing tool: WinRunner, by generating appropriate test cases.

6. Test the supplied project/Application through testing tool: LoadRunner by generating appropriate test cases.

7. Test the supplied project/Application through testing tool:Quick Test Professional by generating appropriate test cases.

TEXT BOOKS:

1. Dr. K.V.K.K. Prasad, *Software Testing Tools*, Dreamtech Press, 2007.
2. Boris Beizer, *Software Testing Techniques*, 2 ed, Dreamtech Press, 2003.
3. Myers and Glenford. J., *The Art of Software Testing*, John-Wiley & Sons, 1979.
4. Roger. S. Pressman, *Software Engineering–A Practitioner's Approach*, 5 ed, McGraw Hill, 2001.
5. Marnie. L. Hutcheson, *Software Testing Fundamentals*, Wiley-India, 2007.

POLICY

Unit Testing

In the V-model of software development, unit testing implies the first stage of dynamic testing process.It involves analysis of the written code with the intention of eliminating errors. It also verifies that thecodes are efficient and adheres to the adopted coding standards. Testing is usually white box. It is done using the Unit test design prepared during the module design phase. This may be carried out by software testers, software developers or both.

Integration Testing

In integration testing the separate modules will be tested together expose faults in the interfaces and in the interaction between integrated components. Testing is usually black box as the code is not directly checked for errors. It is done using the integration test design prepared during the architecture design phase. Integration testing is generally conducted by software testers.

System Testing

System testing will compare the system specifications against the actual system. The system test design derived from the system design documents and is used in this phase. Sometimes system testing is automated using testing tools. Once all the modules are integrated several erros may rise.Testing done at this stage is called system test.

User Acceptance Testing

Acceptance Testing checks the system against the requirements of the user. It uses black box testing using real data, real people and real documents to ensure ease of use and functionality of systems. Users who understand the business functions run the tests as given in the acceptance test plans, including installation and Online help. Hardcopies of user documentation are also being reviewed for usability and accuracy. The testers formally document the results of each test, and provide error reports, correction requests to the developers.

Lab Pre-requirements:

a. Software Project

b. Various test reports like

- Unit Testing reports
- Integration Testing reports
- System Testing reports
- User Acceptance Testing reports

c. Software development Environment like studio, eclipse etc.(where applications are developed)

d. Software Project documents like System requirement document, design document and any other project document for the case.

Test cases are to be generated manually and automated where ever required. The application to be used for this will be supplied in the department. The intention of the student will be to write the various types of test cases , find the defects from the product/ program supplied and fix the issues. Student needs to identify defects accordingly from the V-model of software development.

IV B.Tech. I Semester

10BT71211: WEB PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A Course on "Object Oriented Programming".

COURSE DESCRIPTION: Implementing static web pages with HTML and dynamic web pages by using Java script, JSP; Validation of pages with Java script; Creating sessions with cookies and session object; Accessing databases through JSP.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Analyze XML files using DTD parser.
2. Validate html forms by using Java script.
3. Design and develop styles to the web pages using CSS.
4. Get exposure to various web designing tools like HTML, CSS,JS,XML and JSP.

List of Practicals:

1. Design the following static web pages required for an online book store web site.

A. Home Page:

The static home page must contain the following three frames:

Top frame: Logo and the book store name and links to Home page, about us page, collections page, contact us page and cart page.

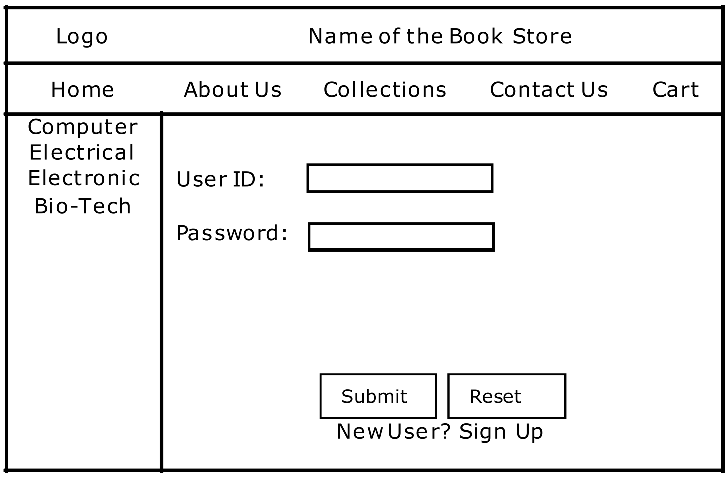
Left frame: At least four links for navigation, which will display the book catalogue of respective areas. For e.g.: when you click the link **"Computer"** the catalogue for computer books should be displayed in the right frame.

Right frame: The pages of the links in the left and top frame must be loaded here. Initially it will display the description of the web site, i.e., page of the Home link will be loaded.

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech	Description of the Web Site			Sign In New User? Sign Up

B. Login Page:

The login page looks like as follows (Link this page to Sign In link):

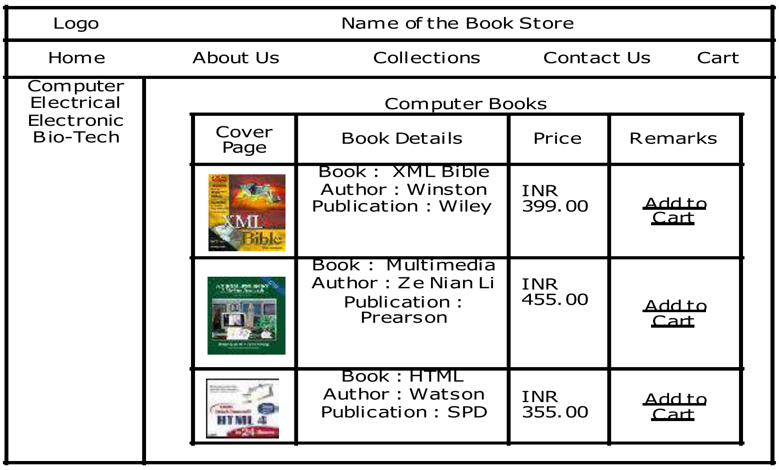


2. Design the following static web pages for an online book store web site.

A. Catalogue Page:

The catalogue page should contain the details of books available in the web site. The details are as follows:

a. Snap shot of cover page b. Text book name
c. Author name d. Publisher
e. Price f. Add to cart link.



B. Registration Page:

Design the Registration page with the following fields (Link this page to Sign Up link).

a. First Name
b. Last Name
c. User ID
d. Password
e. Confirm Password
f. Gender
g. Date of Birth
h. Address
i. Postal Code
j. Linguistics
k. Mobile No.
l. Email-ID

C. Cart Page:

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech		**Selected Books**		
	Book Name	Price	Quantity	Amount
	XML bible	399.00	2	INR 798.00
	HTML	355.00	1	INR 355.00
		Total amount (INR): 1153.00		

3. Write a JavaScript code to validate the following fields of the registration page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 3 characters.
b. User ID - It should contain combination of alphabets, numbers and _. It should not allow spaces and special symbols.
c. Password - It should not be less than 8 characters in length.

4. Write a JavaScript code to validate the following fields of the registration page.

a. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.
b. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

c. E-mail id - It should allow the mail id with the following format:

Ex. mailid@domainname.com

5. Apply the following styles to static pages of online book store web site using CSS (Cascading Style Sheets):

a. Fonts and Styles: font-family, font-style, font-weight and font-size
b. Backgrounds and colors: color, background-color, background-image and background-repeat
c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align
d. Borders: border, border-width, border-color and border-style
e. Styles for links: A:link, A:visited, A:active, A:hover
f. Selectors, Classes and Layers.

6. Write an XML file which includes the following:

a. Title of the book	b. Author of the book
c. ISBN number	d. Name of the publisher
e. Edition	f. Price

i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.
ii. Display the contents of the XML file with the following format using XSL.

The contents should be displayed in a table. The header of the table should be in color grey, and the author names should be displayed in red color, bold and capitalized. Use your own colors for remaining fields.

7. A. Deploy web pages of online book store web site using Apache Tomcat web server and then navigate them thorough the default port number of the tomcat web server.

B. Write a Java Servlet program for displaying the system date.

C. Write a Java Servlet program to red user name and his/her favorite color from the html form.

Display the name of the user in green color and set user favorite color as a background color to the web page.

8. Write a Java Servlet program to read the user id and password entered in the Login form and authenticate with the values (user id and passwords) available in the cookie and web.xml file. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by user id otherwise you should display a message stating that you are not an authorized user. Use the following methods for storing user id's and passwords:

A. Using Cookes - Assume four user id's user1, user2, user3 and user4 and their passwords pwd1, pwd2, pwd3 and pwd4 respectively. Create four cookies on four user id's and passwords.

B. Initialization Parameters in web.xml - Store the user id's and passwords in the web.xml file and access them through the servlet by using the getInitParameters() method.

9. Write a Java Servlet or JSP to store user details (entered in the Registration Form) into the database using JDBC. Use any RDBMS as backend for storing user details.

10. Write a Java Servlet or JSP to authenticate the user by reading user id and password entered in the Login form. Compare User id and password values with user id's and passwords stored at database. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by name (first name + last name), otherwise you should display a message stating that you are not an authorized user.

11. A. Write a Java program for storing books details like Name of the text book, author, publisher, edition and price into the database using JDBC. Store books in database based on the category (i.e., Computer/Electrical/Electronic/Bio-Tech).

B. Write a Java servlet or JSP for updating catalogue page to extract books details from the database and then display them in tabular format using JDBC.

12. HTTP is a stateless protocol. Session is required to maintain the state. The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time (i.e., from different systems in the LAN using the IP-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated. Modify your catalogue and cart pages to achieve the above mentioned functionality using sessions.

III B.Tech. I Semester

10BT51511: OPERATING SYSTEMS AND SYSTEM SOFTWARE LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: A Course on "Computer Programming Lab"

COURSE DESCRIPTION: Simulation of CPU scheduling algorithms, file allocation strategies, Multi programming, file organization Techniques, Bankers algorithm for Deadlock avoidance, Deadlock prevention, page replacement algorithms and paging technique of Memory Management. Creation of symbol tables, implementation of pass one, pass two of two pass assemblers and single pass assembler.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Simulate different algorithms for
   a. CPU Scheduling
   b. File allocation
   c. Memory Management
   d. I/O Management
   e. Deadlock handling Mechanisms
2. Solve problems pertaining to Memory and I/O.
3. Acquire skills in implementing programmes for text processing and symbol table creation and implementation of assemblers.

DETAILED SYLLABUS

I. OPEATING SYSTEMS:

1. Simulate the following CPU scheduling algorithms:
a) FCFS b) Round Robin c) SJF d) Priority
use the following set of processes, compare the performance of above scheduling policies.

Process Name	Arrival Time	Processing Time
A	0	3
B	1	5
C	3	2
D	9	5
E	12	5

2. Simulate the following file allocation strategies
a) Sequential b) Indexed c) Linked
consider the disk consists 20 blocks and file consists 5 records

3. Simulate Multi programming with fixed number of tasks and Multi programming with variable number of tasks.
The size of the memory is 1000K. Operating system size is 200K. No. of processors are P1, P2, P3 with sizes 150K, 100K and 70K.

4. Simulate the following file organization Techniques.
a) Single Level Directory b) Two Level c) Hierarchical
d) DAG

5. Simulate Bankers algorithm for Deadlock avoidance. Consider no.of resources are three and Jobs are four.

6. Write a program to simulate Deadlock prevention.
No.of Resource types are three and jobs are there.

7. Write a Program to simulate the following page replacement algorithms
a) FIFO b) LRU c) LFU d) Optimal
consider no.of Frames are three.
Reference string is 2 3 2 1 5 2 4 5 3 2 4 2 4 5 3

8. Simulate paging technique of Memory Management.

II. SYSTEM SOFTWARE:

1. Accepting and Displaying Names using Text Processing

2. Creation of Symbol Table

3. Pass One of Two Pass Assembler

4. Pass Two of Two Pass Assembler

5. Implementation of Single Pass Assembler

III B.Tech. I Semester

10BT50512: DATABASE MANAGEMENT SYSTEMS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Nil

COURSE DESCRIPTION: Database Design, Storage and Retrieval Using SQL and PL/SQL; DDL; DML; Case Studies on Normalization; Database security and integrity-triggers and constraints.

COURSE OUTCOMES:

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

1. Acquire analytical skills pertaining to E-R model.
2. Design of relational databases using normalization.
3. Develop programming skills in SQL for data retrievals using
    - i) Nested Queries
    - ii) Aggregate Operators
    - iii) Triggers
    - iv) Integrity constraints
4. Apply the SQL and PL-SQL for real time applications in database management systems.

DETAILED SYLLABUS:

DESCRIPTION OF SALES DATABASE

ABC is a company operating in the country with a chain of shopping centers in various cities. Everyday large numbers of items are sold in different shopping centers. The Sales database comprises of various tables like CUST, PROD, SALES_DETAIL, STATE_NAME with the following schemas.

CUST TABLE

Name	Type	Remark
CID	VARCHAR2(6)	PRIMARY KEY
CNAME	VARCHAR2(10)	
CCITY	VARCHAR2(8)	

PROD TABLE

Name	Type	Remark
PID	VARCHAR2(6)	PRIMARY KEY
PNAME	VARCHAR2(6)	
PCOST	NUMBER(4,2)	
PPROFIT	NUMBER(3)	

SALES_DETAIL

Name	Type	Remark
CID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
PID	VARCHAR2(6)	COMPOSITE PRIMARY KEY
SALE	NUMBER(3)	
SALEDT	DATE	COMPOSITE PRIMARY KEY

STATE_NAME

Name	Type	Remark
CCITY	VARCHAR2(8)	PRIMARY KEY
STATE	VARCHAR2(15)	

1. ER MODEL

Draw an ER Model indicating many to many relationship between CUST vs PROD. Show the Cardinality Ratio between PROD and SALES_DETAIL is one-to-many because one product can be sold multiple times. Similarly show the Cardinality Ratio between CUST and SALES_DETAIL is one-to-many because one customer can purchase many products. Indicate CID# and PID# are unique in CUST and PROD entity respectively, where as CID and PID in SALE_DETAIL entity may occur many times.

Represent the ER Model in Tabular Form.

2. NORMALIZATION

In the above relations the following Functional Dependencies exist:

CID → CNAME, CCITY, STATE

PID → PNAME, PCOST, PPROFIT

CID, PID, SALEDT → SALE

CID#	CNAME	CCITY	STATE	PID#	PNAME	PCOST	PROFIT	SALE	SALEDT#
C1	RAVI	HYD	AP	P1	CD	10		5	14-JUL-10
				P3	DVD	20	10	2	14-JUL-10
				P3	DVD	20	10	3	20-AUG-09

Normalize the above table into 1NF, 2NF and 3NF. And handle Insert, Delete and Update anamolies.

3. DATA RETRIEVAL

a) Write a query to display all columns of CUST table.
b) Write a query to display pname of all records. Sort all records by pname. (use order by clause)
c) Write a query to display cname and ccity of all records. Sort by ccity in descending order.
d) Write a query to display cname, ccity who lives in mysore.
e) Write a query to display cname, pname, sale, saledt for all customers.
f) Write a query to display cname who have purchased Pen.
g) Write a query to display saledt and total sale on the date labeled as sale of all items sold after 01-sep-2010.
h) Write a query to display saledt and total sale on the date labeled as sale of all items other than DVD.

i) Write a query to display cname and ccity of all customers who live in Kolkata or Chennai.

4. USE OF DISTINCT, BETWEEN, IN CLAUSE, LIKE OPERATOR, DUAL

a) Write a query to display the pname and pcost of all the customers where pcost lies between 5 and 25.

b) Find the product ids in sale_detail table(eliminating duplicates).

c) Write a query to display distinct customer id where product id is p3 or sale date is '18-mar-2011'.

d) Write a query to display cname, pid and saledt of those customers whose cid is in c1 or c2 or c4 or c5.

e) Write a query to display cname, pid, saledt of those customers whose pid is p3 or sale date is '20-dec-2009'.

f) Write a query to display system date.

g) Write a query to display all records of prod table in which first and third character of pname is any character and second character is 'E'.

h) Write a query to display all cname which includes two 'A' in the name.

5. CONSTRAINTS

a) Implement table level and Column level constraints like NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK.

6. SINGLE ROW FUNCTIONS: DATE FUNCTION

a) Write a query to display the system date by rounding it to next month.

b) Write a query to display the system date by rounding it to next year.

c) Write a query to display the last date of the system date.

d) Write a query to display the next date of system date which is Friday.

e) Write a query to display sale date and date after 02 months from sale date.

f) Write a query to display system date, sale date and months between two dates.

g) Write a query to display the greatest date between sale date and system date, name it as BIG, also display sale date and SYSDATE.

h) Write a query to display the least date between sale date and system date name it as SMALL, also display sale date and SYSDATE.

7. SINGLE ROW FUNCTIONS: NUMERIC AND CHARACTER FUNCTION

a) Write a query to display the product name along with the rounded value of product cost for product name is "Pencil".
b) Write a query to display product cost along with MOD value if divided by 5.
c) Write a query to display cname in uppercase, lowercase, titlecase from cust table where customer name is "rohan".
d) Write a query to display all concatenated value of cname, ccity by converting cname into titlecase and ccity into uppercase.
e) Write a query to display the first 3 characters of cname.
f) Write a query to display the position of 'M' in the cname of the customer whose name is "SAMHITA".
g) Write a query to display the length of all customer names.
h) PAD # character in left of product cost to a total width of 5 character position.

8. GROUP FUNCTIONS AND SET FUNCTIONS

a) Write a query to display the total count of customer.
b) Write a query to display the minimum cost of product.
c) Write a query to display average value of product cost rounded to 2^{nd} decimal places.
d) Write a query to display product name with total sale detail in descending order.
e) Write a query to display product name, sale date and total amount collected for the product.
f) Write a query to display sale date and total sale date wise which was sold after "14-jul-08".
g) Write a query to display the customer name who belongs to those places whose name is having I or P.
h) Write a query to display customer name who belongs to a city whose name contains characters 'C' and whose name contains character 'A'.
i) Write a query to display the customer name who does not belong to PUNE.

9. PL/SQL

a) Write a PL/SQL program to find largest number among three. (Hint: Use Conditional Statement)

b) Write a PL/SQL program to display the sum of numbers from 1 to N using for loop, loop…end and while…loop.

10. SQL CURSOR

a) Write a PL/SQL program to display the costliest and cheapest product in PROD table.

b) Write a PL/SQL program which will accept PID and display PID and its total sale value i.e. sum.

11. FUNCTIONS

a) Write a function that accepts two numbers A and B and performs the following operations.

i. Addition

ii. Subtraction

iii. Multiplication

iv. Division

b) Write a function that accepts to find the maximum PCOST in PROD table.

12. PROCEDURES

a) Write a procedure that accepts two numbers A and B, add them and print.

b) Write procedures to demonstrate IN, IN OUT and OUT parameter.

13. TRIGGER

a) Develop a PL/SQL program using BEFORE and AFTER triggers.

14. CURSOR

a) Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

III B.Tech. II Semester

10BT61511: COMPILER DESIGN AND COMPUTER NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: -

COURSE DESCRIPTION: Simulation of data link framing methods such as bit stuffing and character stuffing and various routing algorithms like shortest path, Distance vector and Broadcast. Implementation of top down and bottom up parsing techniques and design of lexical analyzer using LEX and YACC tools.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire basic programming knowledge of encoding mechanisms in data link and application layers.
2. Skills in simulating various routing algorithms like
   a. Shortest path
   b. Distance vector
   c. Broadcast
3. Designing of Lexical Analyzer and bottom up/ top down parsers using C.
4. Implementing usage of Lex and Yacc tools for lexical analysis and parsing.

DETAILED SYLLABUS:

PART - A: COMPILER DESIGN

1. Design a Lexical analyzer for the given language. The lexical analyzer should ignor redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict length to some reasonable value.

2. Implement the lexical analyzer using FLEX or LEX or other lexical analyzer generating tools.

3. Generate predictive parsing table for the given grammar.

$E1 \rightarrow E\#$,

$E \rightarrow TA$,

$A \rightarrow \in \mid + TA$,

$T \rightarrow FB$,

$B \rightarrow \in \mid * FB$,

$F \rightarrow (E) \mid I$

4. design predictive parser for the above grammar.

5. design LALR bottom up parser for the below language.

Grammar: S -> S$

S -> aA | b | cB | d

A -> aA | b

B -> cB | d

Input Word: aaab$

6. Design a simple calculator using: YAAC

PART - B: COMPUTER NETWORKS

1. Implement the data link layer framing methods such as character, Character stuffing and bit stuffing.

2. Implement on a data set of characters the three CRC polynomials - CRC 12, CRC 16 and CRC CCIP.

3. Implement Dikkstra's algorithm to compute the Shortest path thru a graph.

4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.

5. Take an example subnet of hosts. Obtain broadcast tree for it.

6. Take a 64 bit playing text and encrypt the same using DES algorithm.

7. Write a progrma to break the above DES coding.

III B.Tech. II Semester

10BT61512: OOAD AND WEB PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: A Course on "Object Oriented Software Engineering"

COURSE DESCRIPTION: Designing the different case studies using UML, Developing the homepages, java servlets, cookies and HTTP session protocols for Bookstore website.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire skills in analyzing software requirements and designing of a software product.
2. Design and develop various web applications using JDBC and servlet programming.
3. Software product development using HTML, JSP and JAVA Script.

DETAILED SYLLABUS:

PART-A: OOAD

Case studies given below should be Modeled using Rational Rose tool in different views i.e Use case view, logical view, component view, Deployment view.

CASE STUDY 1: LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned by the library that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 2: A POINT OF SALE (POS) SYSTEM

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client – side terminals and interfaces such as browser, PDA's, touch – screens.

CASE STUDY 3: AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 4: ONLINE TICKET RESERVATION FOR RAILWAYS

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

CASE STUDY 5: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.

The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

CASE STUDY 6: DESIGN A STUDENT REGISTRATION SYSTEM

Problem Statement:

Each student has access to his or her course and grade information only and must be authenticated prior to viewing or updating the information. A course instructor will use the system to view the list of courses he or she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching, and record final grades for each student in the course(s). TA assignments will also be viewable through this system. Instructors must also be authenticated prior to viewing or updating any information.

CASE STUDY 7: ONLINE AUCTION SALES

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

PART-B: WEB PROGRAMMING

List of Practicals:

1. Design the following static web pages required for an online book store web site.

A. Home Page:

The static home page must contain the following three frames:

Top frame: Logo and the book store name and links to Home page, about us page, collections page, contact us page and cart page.

Left frame: At least four links for navigation, which will display the book catalogue of respective areas. For e.g.: when you click the link **"Computer"** the catalogue for computer books should be displayed in the right frame.

Right frame: The pages of the links in the left and top frame must be loaded here. Initially it will display the description of the web site, i.e., page of the Home link will be loaded.

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech	Description of the Web Site		Sign In New User? Sign Up	

B. Login Page:

The login page looks like as follows (Link this page to Sign In link):

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech	User ID: [ ] Password: [ ] [Submit] [Reset] New User? [Sign Up]			

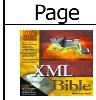
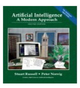
2. Design the following static web pages for an online book store web site.

A. Catalogue Page:

The catalogue page should contain the details of books available in the web site. The details are as follows:

a. Snap shot of cover page b. Text book name
c. Author name d. Publisher
e. Price f. Add to cart link.

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech	Computer Books			

Cover Page	Book Details	Price	Remarks
	Book : XML Bible Author : Winston Publication : Wiley	INR 399.00	Add to Cart
	Book : Multimedia Author : Ze Nian Li Publication : Prearson	INR 455.00	Add to Cart
	Book : HTML Author : Watson Publication : SPD	INR 355.00	Add to Cart

B. Registration Page:

Design the Registration page with the following fields (Link this page to Sign Up link).

a. First Name b. Last Name
c. User ID d. Password
e. Confirm Password f. Gender
g. Date of Birthh. Address i. Postal Code
j. Linguistics k. Mobile No.
l. Email-ID

C. Cart Page:

<table>
<tr><td>Logo</td><td colspan="4">Name of the Book Store</td></tr>
<tr><td>Home</td><td>About Us</td><td>Collections</td><td>Contact Us</td><td>Cart</td></tr>
<tr><td>Computer
Electrical
Electronic
Bio-Tech</td><td colspan="4"><u>Selected Books</u>

<u>Book Name</u> | <u>Price</u> | <u>Quantity</u> | <u>Amount</u>
XML bible | 399.00 | 2 | INR 798.00
HTML | 355.00 | 1 | INR 355.00

Total amount (INR): 1153.00</td></tr>
</table>

3. Write a JavaScript code to validate the following fields of the registration page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 3 characters.
b. User ID - It should contain combination of alphabets, numbers and _. It should not allow spaces and special symbols.
c. Password - It should not be less than 8 characters in length.

4. Write a JavaScript code to validate the following fields of the registration page.

a. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.
b. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

c. E-mail id - It should allow the mail id with the following format:

   Ex. mailid@domainname.com

5. Apply the following styles to static pages of online book store web site using CSS (Cascading Style Sheets):

a. Fonts and Styles: font-family, font-style, font-weight and font-size
b. Backgrounds and colors: color, background-color, background-image and background-repeat
c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align
d. Borders: border, border-width, border-color and border-style
e. Styles for links: A:link, A:visited, A:active, A:hover
f. Selectors, Classes and Layers.

6. Write an XML file which includes the following:

a. Title of the book	b. Author of the book
c. ISBN number	d. Name of the publisher
e. Edition	f. Price

i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.
ii. Display the contents of the XML file with the following format using XSL.

The contents should be displayed in a table. The header of the table should be in color grey, and the author names should be displayed in red color, bold and capitalized. Use your own colors for remaining fields.

7. A. Deploy web pages of online book store web site using Apache Tomcat web server and then navigate them thorough the default port number of the tomcat web server.

B. Write a Java Servlet program for displaying the system date.

C. Write a Java Servlet program to red user name and his/her favorite color from the html form.

Display the name of the user in green color and set user favorite color as a background color to the web page.

8. Write a Java Servlet program to read the user id and password entered in the Login form and authenticate with the values (user id and passwords) available in the cookie and web.xml file. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by user id otherwise you should display a message stating that you are not an authorized user. Use the following methods for storing user id's and passwords:

A. Using Cookes - Assume four user id's user1, user2, user3 and user4 and their passwords pwd1, pwd2, pwd3 and pwd4 respectively. Create four cookies on four user id's and passwords.

B. Initialization Parameters in web.xml - Store the user id's and passwords in the web.xml file and access them through the servlet by using the getInitParameters() method.

9. Write a Java Servlet or JSP to store user details (entered in the Registration Form) into the database using JDBC. Use any RDBMS as backend for storing user details.

10. Write a Java Servlet or JSP to authenticate the user by reading user id and password entered in the Login form. Compare User id and password values with user id's and passwords stored at database. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by name (first name + last name), otherwise you should display a message stating that you are not an authorized user.

11. A. Write a Java program for storing books details like Name of the text book, author, publisher, edition and price into the database using JDBC. Store books in database based on the category (i.e., Computer/Electrical/Electronic/Bio-Tech).

B. Write a Java servlet or JSP for updating catalogue page to extract books details from the database and then display them in tabular format using JDBC.

12. HTTP is a stateless protocol. Session is required to maintain the state. The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time (i.e., from different systems in the LAN using the IP-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated. Modify your catalogue and cart pages to achieve the above mentioned functionality using sessions.

III B. Tech. II Semester

10BT61513: **SEMINAR**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
75	-	75	-	-	-	2

PREREQUISITES: All the courses of the program up to III B. Tech. – I Semester.

COURSE DESCRIPTION:
Identification of topic for the seminar; Literature survey; Performing critical study and analysis of the topic identified; Preparation of report and presentation.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire in-depth knowledge in the areas of interest of the seminar topic.
2. Analyze critically chosen seminar topic for substantiated conclusions.
3. Design solutions for the seminar topic chosen.
4. Undertake investigation of seminar output providing valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for conducting seminar work.
6. Understand the impact of seminar output in the context of environmental sustainability.
7. Understand professional and ethical responsibilities for sustainable development of society in the chosen field of seminar.
8. Function effectively as individual on the chosen seminar topic.
9. Develop communication skills, both oral and written for preparing and presenting seminar reports.
10. Engage in lifelong learning to improve knowledge and competence in the chosen field of seminar.

IV B.Tech. I Semester

10BT71511: DATA WAREHOUSING AND DATA MINING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A Course on "Database Management Systems Lab"

COURSE DESCRIPTION: Data transformations like aggregation, filter, joiner transformations using Informatica and different data mining functionalities like preprocessing, visualization, association, classification using weka, conversion of different files from one format to another, classification using Rapid Miner.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire analyzing, designing and implementation skills in Data warehousing.
2. Inculcate Skills to solve for real time applications in area of data warehousing and mining.
3. Usage of modern tools like Rapid miner and WEKA for analysis of retrieved data.

DETAILED SYLLABUS:

List of Experiments:

I. INFORMATICA:

1. Introduction to Informatica
2. Creation of Simple Mapping from Oracle to Oracle
3. Design a Mapping Using Filter transformation
4. Design a Mapping Using Aggregate transformations
5. Design a Mapping Using Joiner transformations
6. Construction and evaluation of multidimensional cubes

II. RAPID MINER

1. Importing metadata using rapid miner
2. To store and retrieve data into Rapid Miner tool.

III. WEKA

1. Introduction to WEKA
2. Creation of Data set in .arff, and csv format

IV. VISUALIZATION

1. Experiment on student details using weka tool in arff format for generating visualization graphs.
2. Experiment on employee details using weka tool in arff format for generating visualization graphs.

V. PREPROCESSING

1. Preprocess the given German credit data using preprocessing techniques like Loading Data, Selecting or filtering attributes.
2. Preprocess the given German credit data using preprocessing techniques like discretization, Missing values.

VI. ASSOCIATION

1. Generate Frequent Patterns and Association Rules using Apriori Algorithm

VII. CLASSIFICATION (GERMAN CREDIT DATA AND WEATHER DATA)

1. What attributes do you think might be crucial in making the credit assessment? Come up with some simple roles in plain English using your selected attributes.
2. Create is a decision tree using complete dataset as the training data.

VIII. KNOWLEDGE FLOW

1. Normalize the data in a data set and store the output in CSV format as separate file and apply CFS Subset evaluator and best first search Method filter using the Knowledge flow.
2. Generate a Knowledge flow dataset Using ID3 Classification.

IV B.Tech. I Semester

10BT71511: NETWORK PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: -

COURSE DESCRIPTION: Design of pipes, FIFO, iterative client-server models, concurrent client-server models, Remote Procedures, Message Queues, Implementation of Shared memory concepts.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Implement inter process communication mechanisms.
2. Obtain Programming skills for developing TCP and UDP Connectivity for client server applications.
3. Build network applications using RPC.

DETAILED SYLLABUS:

List of Practicals:

1. Implement the following
a) Pipes b) FIFO

2. Implement file transfer using Message Queue form of IPC.

3. Implement file transfer using Shared Memory.

4. Design TCP iterative Client and Server Application to print current Date and Time.

5. Design TCP iterative Client and Server Application to reverse the given input sentence.

6. Design TCP Client and Server Application to transfer file.

7. Design TCP concurrent server to echo given set of sentences using poll functions.

8. Design UDP Client and server application to implement the echo concept.

9. Design TCP Concurrent server to handle multiple file descriptors using System Call Select.

10. Design UDP Client and server application to reverse the given imput sentence

11. Design UDP Client server to transfer a file

12. Design using poll Client server application to multiplex TCP and UDP requests for converting a given text into upper case.

13. a) Write an RPC Application to Square a number.
b) Design a RPC Application to add and subtract a given pair of integers.

IV B. Tech. I Semester

10BT71513: **MINI-PROJECT**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	-	2

PREREQUISITES: All courses of the program up to III B. Tech. – II Semester.

COURSE DESCRIPTION:

Identification of topic for the mini-project; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Acquire in-depth knowledge in the thrust areas of industry.
2. Analyze critically chosen problem for developing a product.
3. Design solutions through knowledge gained through programme, for solving problem efficiently.
4. Undertake investigation of mini-project results providing valid conclusions.
5. Use the appropriate techniques, resources and modern engineering tools necessary for mini- project work.
6. Apply mini project results for sustainable development of the society.
7. Understand the impact of mini project results in the context of environmental sustainability.
8. Understand professional and ethical responsibilities for sustainable development in the chosen field of mini project.
9. Perform harmonically in multi-cultural groups, and develop a high level of interpersonal skills.
10. CDevelop communication skills, both oral and written for preparing and presenting reports.
11. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
12. Engage in lifelong learning to improve knowledge and competence continuously.

III B.Tech. I Semester

10BT50411: ANALOG COMMUNICATIONS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on Analog communications

COURSE DESCRIPTION:

Modulators and demodulators for AM and FM systems; Associated circuits; Spectral analysis of AM and FM signals.

COURSE OUTCOMES: At the end of the course students will be able to:

CO1. Analyze problems pertaining to analog modulation, demodulation and associated circuits.

CO2. Design and develop analog modulation, demodulation and associated circuits.

CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

DETAILED SYLLABUS :

Minimum Twelve experiments to be conducted:

1. Amplitude modulation and demodulation.
2. Diode detector characteristics.
3. Frequency modulation and demodulation.
4. Balanced modulator.
5. Pre-emphasis & de-emphasis.
6. Characteristics of mixer.
7. Digital Phase detector.
8. Phase locked loop.
9. Synchronous detector.
10. SSB system.
11. Spectral analysis of AM and FM signals using spectrum analyzer.
12. Squelch Circuit.
13. Frequency Synthesizer.
14. AGC Characteristics.

III B.Tech. I Semester

10BT50412: PULSE AND DIGITAL CIRCUITS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: A course on Pulse and Digital Circuits

COURSE DESCRIPTION:

Wave shaping circuits; switching characteristics of transistor; UJT relaxation oscillator; sampling and logic gates; Design of multivibrator circuits.

COURSE OUTCOMES: At the end of the course students will be able to:

CO1. Analyze electronic circuits pertaining to Integrator , Differentiator, Clipping and clamping circuits.

CO2. Design and develop multivibrator circuits.

CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

DETAILED SYLLABUS :

List of Experiments: (Minimum of twelve experiments to be conducted)

PART – A

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers and Clampers.
3. Transistor as a switch.
4. Sampling Gates.
5. Schmitt Trigger.
6. UJT Relaxation Oscillator.
7. Bootstrap sweep circuit.
8. Constant Current Sweep Generator using BJT.
9. Study of Logic Gates & Some applications.
10. Study of Flip-Flops & some applications.

PART – B (Design aspects to be included)

1. Bistable Multivibrator.
2. Monostable Multivibrator.
3. Astable Multivibrator.

III B.Tech. II Semester

10BT60411: MICROPROCESSORS AND MICROCONTROLLERS LAB

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Course on Digital logic design, Microprocessors and Microcontrollers

COURSE DESCRIPTION:

Assembly language Programming for Intel 8085, 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES: At the end of the course students will be able to:

CO1. Analyze various programming alternatives & interfacing methods to build a typical microcomputer based system.
CO2. Design and develop microcomputer based system to solve various problems.
CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

DETAILED SYLLABUS :

Any **TWELVE** experiments to be conducted

I Programs using 8085

1. Arithmetic operations
2. Logical operations

II Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

III Interfacing Programs with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

IV Programs using 8051

1. Arithmetic operations

2. Addition operation using external memory

3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

III B.Tech. II Semester

10BT60412: IC APPLICATIONS AND ECAD LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Linear IC applications and Digital IC applications

COURSE DESCRIPTION:

Design, simulation and verification of OPAMP Applications; Filters, Timers, VCO, Voltage Regulator, ADC and DAC; Simulation and synthesis of combinational and sequential circuits.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1. Perform analysis of linear circuits and Digital system design.
CO2. Acquire skills by solving problems in the domain of linear and Digital Systems.
CO3. Use modern CAD tools to analyze problems of RTL, Technology schematic, and system implementation in digital domain.

DETAILED SYLLABUS :

Minimum Twelve Experiments to be conducted:

Part A (IC Application Lab): (Minimum Six experiments to be conducted)

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (First & Second order).
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit ADC & DAC.
8. Precision rectifier using OP Amp.

Part B (ECAD Lab): (Minimum Six experiments to be conducted)

Simulate the internal structure of the following Digital IC's using VHDL and verify the operations of the Digital IC's (Hardware) in the Laboratory

1. Logic Gates- 74XX.
2. Half Adder, Half Subtractor, Full Adder, Full Subtractor & Ripple Carry Adder.
3. 3-8 Decoder -74X138 & 8-3 Encoder- 74X148.
4. 8 x 1 Multiplexer -74X151 and 2x4 Demultiplexer-74X155.
5. 4 bit Comparator-74X85.
6. D Flip-Flop 74X74 and JK Flip-Flop 74X109.
7. Decade counter-74X90.

8. Universal shift register -74X194
9. RAM(16x4)-74189.

IV B.Tech. I Semester

10BT70411: DIGITAL COMMUNICATIONS AND MICROWAVES LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on Digital Communications and Microwave Engineering.

COURSE DESCRIPTION:

Design and study of various Digital modulation and Demodulation circuits and schemes and characteristics of Microwave power supplies and components.

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

CO 1. Analyze the characteristics and working of various microwave components like attenuators, directional couplers, Horn antennas etc.

CO 2. Design various digital modulation and demodulation circuits and study their characteristics.

CO 3. Solve problems given in Digital and microwave communication systems.

DETAILED SYLLABUS :

Minimum Twelve Experiments to be conducted:

Part – A (Any 6 Experiments):

1. Pulse Amplitude Modulation and demodulation
2. Pulse Width Modulation and demodulation
3. Pulse Position Modulation and demodulation
4. Sampling Theorem – verification
5. Pulse code modulation and demodulation
6. Delta modulation and demodulation
7. FSK and PSK Modulation and demodulation
8. DPSK Modulation and demodulation

Part – B (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Attenuation Measurement
4. Directional Coupler Characteristics
5. VSWR Measurement
6. Impedance Measurement
7. Waveguide parameters measurement

IV B.Tech. I Semester

10BT70412: DIGITAL SIGNAL PROCESSING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE REQUISITE: Courses on Simulation and C Programming lab

COURSE DESCRIPTION:

Implementation of Convolution, DFT and FFT. Designing Analog, FIR and IIR filters

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

CO1. Demonstrate skills in

i. Simulation and emulation of basic concepts and algorithms such as convolutio, DFT, FFT in sigal processing using CCS.

ii. Design and simulation of an Digital and Aalog filters such as IIR,FIR ad Butterworth proto type.

CO2. Solve engineering problems for feasible and optimal solutions in the core area of signal processing.

CO3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

CO4. Use MATLAB Toolboxes to complex engineering activities in the domain of Signal processing.

DETAILED SYLLABUS :

List of Experiments: (Minimum of Twelve experiments to be conducted)

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
   a) Using Rectangular window
   b) Using Triangular window
   c) Using Kaiser window
5. To design FIR filter (BP/BR) using windowing technique
   a) Using Rectangular window
   b) Using Triangular window
   c) Using Kaiser window
6. To design FIR filter (LP/HP) using windowing technique
   a) Using Hamming window
   b) Using Hanning window
   c) Using Blackmann window

7. To design FIR filter (BP/BR) using windowing technique
    a) Using Hamming window
    b) Using Hanning window
    c) Using Blackmann window
8. To Implement IIR filter (LP/HP) on DSP Processors
9. To Implement IIR filter (BP/BR) on DSP Processors
10. Design of FIR filters using frequency sampling method.
11. To verify N-point DFT & IDFT.
12. N-point FFT algorithm.
13. MATLAB program to find frequency response of analog LP/HP filters.

III B. Tech., I-Semester, EEE

L	T	P	C
-	-	3	2

10BT50211: TRANSFORMERS AND AC MACHINES LAB

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Transformers and Induction Machines of II B.Tech., II-Semester

COURSE DESCRIPTION:
Determination of Performance of Transformers and Induction motors; Regulation of alternator; V and Inverted V curves, calculation of X_d and X_q of a salient pole synchronous machine

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. demonstrate knowledge on identification of parts of Transformers and AC machines
2. analyze the performance of Transformers and AC machines
3. design the circuit based on loading and rating of the Transformers and Induction machines.
4. demonstrate skills in
   - obtaining the various characteristics of Transformers and AC machines.
   - determining the performance characteristics of Transformers and AC machines.
   - determining and separating losses in Transformers and AC machines.
5. function effectively as individual and as member in a team
6. Communicate effectively both oral and written

DETAILED SYLLABUS:
The following experiments are required to be conducted as compulsory experiments:

1. O. C. & S. C. Tests on Single phase Transformer
2. Sumpner's test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by E. M. F and M. M. F. methods
6. V and Inverted V curves of a three—phase synchronous motor.
7. Equivalent Circuit of a single phase induction motor
8. Determination of Xd and Xq of a salient pole synchronous machine

In addition to the above eight experiments, atleast any FOUR of the following experiments are required to be conducted from the following list:

1. Parallel operation of Single phase Transformers
2. Separation of core losses of a single phase transformer
3. Brake test on three phase Induction Motor
4. Separation of no-load losses of 3-phase induction motor.
5. Brake test on single phase Induction Motor
6. Regulation of three-phase alternator by Z. P. F. and A. S. A methods
7. Efficiency of a three-phase alternator
8. Heat run test on a bank of 3 Nos. of single phase Delta connected transformers
9. Measurement of sequence impedance of a three-phase alternator.
10. Performance characteristics of a Schrage motor

III B. Tech., I-Semester, EEE

10BT50212: MEASUREMENTS AND TESTING LAB

L	T	P	C
-	-	3	2

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Electrical Measurements of II B.Tech., II-Semester

COURSE DESCRIPTION:
Measurement of Resistance, Inductance, Capacitance, Power and power factor; Testing of single phase energy meter, reverse power relay and Transformer oil

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate knowledge on measurement of electrical parameters
2. Identify various bridges for measuring Low, medium and high values of resistance, inductance and capacitance
3. Develop skills and methods in measurement of power and energy.
4. Application of different measuring instruments in the field of electrical engineering
5. function effectively as individual and as member in a team
6. Present a cohesive and detailed laboratory report

DETAILED SYLLABUS:
The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing Of Single Phase Energy Meter
2. Calibration of dynamometer power factor meter
3. Crompton D. C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin's double Bridge and Whetstone's bridge – Measurement of resistance – Determination of Tolerance.
5. Measurement of % ratio error and phase angle of given C. T. by Silsbee's method.
6. Schering bridge & Anderson bridge.
7. Measurement of Three phase reactive power with single-phase wattmeter.
8. Measurement of parameters of a choke coil using three voltmeter and three ammeter methods.

In addition to the above eight experiments, at least any FOUR of the experiments from the following list are required to be conducted:

9. Measurement of Earth resistance using Earth Megger
10. Calibration LPF wattmeter – by Phantom testing
11. Measurement of 3 phases active and reactive power with Two watt meter by unbalanced load.
12. Dielectric oil testing using H. T. testing Kit
13. LVDT and capacitance pickup – characteristics and Calibration
14. Resistance strain gauge – strain measurements and Calibration
15. Transformer turns ratio measurement using A. C. Bridge.
16. A. C. Potentiometer – Calibration of AC Voltmeter, Parameters of Choke.
17. Testing of reverse power relay.
18. Measurement of three phase power using one wattmeter with two no. of C. Ts

III B. Tech., II-Semester, EEE

L	T	P	C
-	-	3	2

10BT60211: CONTROL SYSTEMS AND SIMULATION LAB

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Control Systems of III B.Tech., I-Semester

COURSE DESCRIPTION:
Time response of second order system, application of PLC's, study the effect of feedback; effect of PID controller on second order system; compensator design and characteristics of Synchros, magnetic amplifiers and AC servo motor; Simulation of Physical systems using PSPICE, stability analysis, determination of state space model and time domain specifications of a given transfer function using MATLAB

COURSE OUTCOMES: On successful completion of this course the students will be able to

1. Demonstrate Knowledge on
    - the effect of feedback and different controllers.
    - Conversion of transfer function into state model
2. Analyze the characteristics of synchros, servo motors and magnetic amplifiers.
3. Design a ladder network for a PLC to verify Boolean expressions
4. Evaluate the effect of controllers and determine time domain and frequency domain specifications of second order system.
5. Apply MATLAB to determine stability and time domain specifications of second order system
6. Apply control engineering concepts in DC position control and temperature control systems.
7. function effectively as individual and as member in a team
8. Present a cohesive and detailed laboratory report

DETAILED SYLLABUS:
Any **EIGHT** of the following experiments are to be conducted from part A:

PART A:

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC Machine
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Lag and lead compensation – Magnitude and phase plot
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor

Any **FOUR** of the following experiments are to be conducted from part B:
PART B:
1. PSPICE simulation of Op-Amp based Integrator and Differentiator circuits.
2. Linear system analysis (Time domain analysis, Error analysis) using MATLAB.
3. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB
4. State space model for classical transfer function using MATLAB – Verification.
5. Plot unit step response of given second order transfer function and find peak overshoot, peak time, rise time and delay time.

III B. Tech., II-Semester, EEE

L	T	P	C
-	-	3	2

10BT60212: POWER ELECTRONICS AND SIMULATION LAB

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Power Electronics of III B.Tech., I-Semester and Electrical Circuits and Simulation Lab of II B.Tech., II-Semester

COURSE DESCRIPTION:
Characteristics of power semiconductor devices, different firing schemes, operation and control of converters with R, RL and motor loads; operation of chopper, Inverter, Cycloconverter; Four quadrant operation of DC motor using Microprocessor; Simulation of Power electronic circuits using PSPICE

COURSE OUTCOMES: On successful completion of this course the students will be able to
1. Demonstrate practical knowledge in:
   - Operation of power semi conductor devices such as SCR, BJT, MOSFET and IGBT.
   - Understanding gate firing circuits for SCR.
2. Analyze and relate physical observations and measurements of various power converters with theoretical principles
3. Design the power electronic circuit and validate using PSPICE
4. Select and apply a suitable commutation circuit for various power electronic converters
5. Build and test various converter circuits using PSPICE
6. apply power converters for speed control of DC motor
7. function effectively as individual and as member in a team
8. Prepare laboratory reports that clearly communicate experimental information

DETAILED SYLLABUS:

Any **TEN** experiments to be conducted from part A:

PART A:

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's(R, RC Triggering, Half bridge & Full bridge converter)
3. Single Phase half-Wave controlled converter with R and RL loads
4. Single Phase Half controlled bridge converter with R and RL loads
5. Single Phase fully controlled bridge converter with R and RL loads
6. Speed control of DC Motor Using Single Phase Half controlled bridge converter
7. Speed control of DC Motor Using Single Phase Fully controlled bridge converter
8. Single Phase AC Voltage Controller with R and RL Loads
9. Forced Commutation circuits (Class A, Class B, Class C, & Class D)
10. DC Jones chopper with R and RL Loads
11. Single Phase Parallel, inverter with R and RL loads
12. Single Phase Cycloconverters with R and RL loads
13. Single Phase series inverter with R and RL loads
14. Single Phase dual converter with RL loads
15. Single Phase Input IGBT Based 4-Quadrant Chopper Using Micro Processor

In addition to the above ten experiments, at least any **TWO** of the experiments from the following list are required to be conducted:

PART B:

1. Analysis of Three Phase circuit using PSPICE
2. Simulation of Single Phase Full converter for RLE Load using PSPICE
3. Simulation of resonant pulse commutation circuit and Buck chopper using PSPICE
4. Simulation of single phase Inverter with PWM control using PSPICE

IV B. Tech., I-Semester, EEE

10BT60411: MICROPROCESSORS AND MICROCONTROLLERS LAB

L	T	P	C
-	-	3	2

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Microprocessors and Microcontrollers of III B.Tech., II-Semester

COURSE DESCRIPTION:
Arithmetic and logical operations using 8085 and 8086 microprocessors; interfacing programs with 8086; programs using 8051

COURSE OUTCOMES: On completion of this course, a successful student will be able to
1. Demonstrate knowledge on assemblers, macros, instruction set of 8085, 8086, 8051
2. Analyze the requirements critically and write programs occupying less space in memory and executes faster.
3. design suitable interfaces for real time applications
4. exhibit skills to test and debug programs in the laboratory and choose suitable hardware and program the devices to solve engineering problems
5. function effectively as individual and as member in a team
6. Prepare laboratory reports that clearly communicate experimental information

DETAILED SYLLABUS:
Any **TWELVE** experiments to be conducted:

I Programs using 8085
1. Arithmetic operations
2. Logical operations

II Programs using 8086
1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

III Interfacing Programs with 8086
1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven Segment Display
5. Keyboard Interfacing

IV Programs using 8051
1. Arithmetic operations
2. Addition Operation using External Memory
3. Programs using special instruction like SWAP, bit/byte, set/reset etc.

IV B. Tech., I-Semester, EEE

L	T	P	C
-	-	3	2

10BT70211: POWER SYSTEMS AND SIMULATION LAB

ASSESSMENT:

DAY-TO-DAY EVALUATION	INTERNAL EVALUATION	END LAB EXAMINATION	TOTAL
15 MARKS	10 MARKS	50 MARKS	75 MARKS

PREREQUISITES: Power System Operation and Control and Power System Analysis of IV B.Tech., I-Semester

COURSE DESCRIPTION:
Determination of sub-transient reactance, sequence impedances, sequence components and power angle characteristics of synchronous machine; determination of load flows using MATLAB software; simulation of synchronous machine and load frequency problem

COURSE OUTCOMES: On completion of this course, a successful student will be able to

1. Demonstrate knowledge on the usage of MATLAB and SIMULINK
2. Analyze
   - faults on synchronous generator
   - the power flow in power system network using various Load flow methods
3. Apply Skills to
   - obtain over current relay characteristics
   - determine sequence components of salient pole synchronous machine
4. Apply MATLAB
   - to determine Y-bus, Z-bus and power flow in power system network
   - to investigate load frequency problem using SIMULINK
5. function effectively as individual and as member in a team
6. Communicate effectively both oral and written

DETAILED SYLLABUS:
The following experiments are required to be conducted as compulsory experiments

PART A: POWER SYSTEMS EXPERIMENTS

1. Determination of Sub-transient Reactance of Salient Pole Synchronous Machine.
2. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
3. LG & LL Fault Analysis of Synchronous Generator.
4. Power Angle Characteristics of Salient Pole Synchronous Machine.
5. Determination of Sequence components of Salient Pole Synchronous Machine.
6. Characteristics of Over Current Relay

PART B: SIMULATION EXPERIMENTS

1. Formation of Y-bus using MATLAB program
2. Formation of Z-bus using MATLAB program
3. Gauss-Seidel method load flow analysis using MATLAB program
4. Newton Raphson method load flow analysis using MATLAB program
5. Development of MATLAB/SIMULINK model for a synchronous machine with and without AVR
6. Development of MATLAB/SIMULINK model for a single area and two area load frequency problem and simulate the same.

III B.Tech. I Semester

10BT50431: **IC & PDC LAB**

(Common to EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE REQUISITE:

Semiconductor Devices and Circuits, Pulse and Digital Circuits, Switching Theory and Logic Design.

COURSE DESCRIPTION:

Linear and Non linear wave shaping circuits; transistor as a switch; sampling gates; Multivibrators; logic gates and flip-flops.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Analyze simple electronic circuits in terms of theoretical and practical performance.
2. Designa and develop circuits using discrete components and Ics.

DETAILED SYLLABUS :

List of Experiments:

PART – A:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers & Clampers.
3. Transistor as a switch.
4. Sampling Gates.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Schmitt Trigger.
8. UJT Relaxation Oscillator.
9. Bootstrap sweep circuit.

PART – B: (Design Aspects to be Included)

1. Bistable Multivibrator.
2. Monostable Multivibrator.
3. Astable Multivibrator.

III B.Tech. I Semester

10BT51011: MEASUREMENTS AND TRANSDUCERS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITE: Transducers in Instrumentation, Electrical and Electronic Measurements.

COURSE DESCRIPTION:

Measurements of parameters: voltage, resistance, inductance, capacitance, displacement, pressure, force and temperature.

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

1. Carry out analysis of instrument in terms of accuracy, Linearity and Calibration.
2. Design and develop measuring circuits for voltage, current and resistance.

DETAILED SYLLABUS :

Minimum of **12** Experiments to be conducted

1. Measurement of AC parameters (Voltage & Current) using D' Arsonval Galvanometers
2. Conversion of D'Arsonval Galvanometer into ohmmeter (Series & Shunt)
3. Measurement of unknown resistance, inductance and capacitance using bridge circuits
4. Study of Spectrum Analyzer
5. Measurement of resistance, inductance, capacitance and quality factor of the coil using Q meter
6. Calibration and testing of single phase energy meter
7. Linear displacement measurement using LVDT
8. Temperature measurement using RTD
9. Strain measurement using Strain Gauges
10. Angular displacement using Capacitive transducer
11. Transfer characteristics of thermocouple
12. Level measurement using Fibre-optic sensor
13. Pressure measurement using Bourdon tube
14. Study of Piezoelectric Transducer

III B.Tech. II Semester

10BT60411: **MICROPROCESSORS AND MICROCONTROLLERS LAB**

(Common to ECE, EIE & EConE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Course on Digital logic design, Microprocessors and Microcontrollers

COURSE DESCRIPTION:

Assembly language Programming for Intel 8085, 8086 & 8051; Interfacing standard peripherals & Programming-DAC, Stepper Motor, ADC, Logic Controller, Keyboard, Seven Segment Display.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Analyze various programming alternatives & interfacing methods to build a typical Micro computer based system.
2. Design and develop microcomputer based system to solve various problems.
3. Conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

DETAILED SYLLABUS :

Any **TWELVE** experiments to be conducted

I Programs using 8085

1. Arithmetic operations
2. Logical operations

II Programs using 8086

1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

III Interfacing Programs with 8086

1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven segment display
5. Keyboard interfacing

IV Programs using 8051

1. Arithmetic operations
2. Addition operation using external memory
3. Programs using special instructions like SWAP, bit/byte, set/ reset etc.

III B.Tech. II Semester

10BT61011: **PROCESS CONTROL LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Control Systems, Process Control Instrumentation.

COURSE DESCRIPTION:

Tuning methods, Characteristics of control valve, Response of controllers for different processes like flow, temperature, level etc.

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

1. Analyze the characteristics of control valve and evaluate the performance of controllers for different process like flow, temperature, level etc.
2. Design the controller parameters using various tuning methods.

DETAILED SYLLABUS :

Minimum **10** experiments should be conducted

1. Response of Interacting and Non-interacting Systems.
2. Servo and regulator operation.
3. Realization of control actions: Pneumatic controllers.
4. Realization of control actions: Electronic controllers.
5. Response of Flow process.
6. Response of Level Process.
7. Response of Temperature Process.s
8. Process tuning - Process reaction curve method.
9. Process tuning - continuous and damped oscillation method.
10. Pneumatic Actuator.
11. Control valve characteristics (ON-OFF & LINEAR).
12. Multi loop control systems - Ratio Control.
13. Multi loop control systems - Cascade Control.

IV B.Tech. I Semester

10BT71011: ANALYTICAL & BIOMEDICAL INSTRUMENTATION LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Analytical instrumentation, biomedical instrumentation

COURSE DESCRIPTION:

Measurements of parameters: calorific value, blood pressure, respiration rate and heart sounds; characteristics of spectrometer; gas chromatography, and flame photometer.

COURSE OUTCOMES: At the end of the course students will be able to:

1. Measure heart sounds, respiration rate, pH Value and calorific value of the sample.
2. Analyze the sample using spectrophotometer, flame photometer, gas chromatograph and Geiger Muller counter.

DETAILED SYLLABUS:

Minimum **10** experiments to be conducted

1. pH measurement.
2. Spectrometer: UV and VIS spectrometer
3. Flame Photometer
4. Geiger Muller Counter
5. Gas chromatography
6. Measurement of calorific value
7. Thermal conductivity detector
8. Blood pressure measurement
9. Measurement of blood flow
10. Study of ECG
11. Design of Instrumentation Amplifier for bioelectrical Signals
12. Measurement of Respiration rate
13. Measurement of heart sounds

IV B.Tech. I Semester

10BT71012: **PLC AND LABVIEW PROGRAMMING LAB**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PRE-REQUISITES: Automation of Industrial Processes

COURSE DESCRIPTION:

This course is aimed to know the automation concepts of a process using PLCs and (or) LabVIEW.

COURSE OUTCOMES: After completion of the course the student is able to

1. Design and develop solutions for automation that meet desired specifications and requirements.
2. Use modern tools in the field of instrumentation.

DETAILED SYLLABUS:

Minimum **10** experiments to be conducted

Part A: PLC

1. Implementation of Logic gates, timer and counters.

2. Level control.

3. Pressure control.

4. Motor speed control.

5. Bottle filling system.

6. Temperature control.

Part B: LabVIEW

1. Study of functional blocks.

2. Experiments using Boolean and numeric functional blocks.

3. Experiments using string and array functional blocks.

4. Convert Centigrade to Fahreinheat.

5. Creation of Sub VI.

6. Analyzing and logging of data.

7. Cluster and Error handling.

III B.Tech. II Semester

10BT61211: OBJECT ORIENTED ANALYSIS AND DESIGN LAB

Int. Marks	Ext. Marks	Total Marks	L T P C
25	50	75	- - 3 2

PREREQUISITES: Nil

COURSE DESCRIPTION: Modeling case studies using Visual paradigm tool in usecase view, logical view, component view and deploymentview.

COURSE OUTCOMES:

On successful completion of this course, the student willbe able to:

1. Gain skills in gathering user requirements and represent them using use case diagrams.
2. Design and develop Structural, Behavioral and Architectural models to reflect solutions for complex engineering problems.
3. Apply Modeling techniques to visualize UML diagrams for use case, logical, component and deployment views in solving real world problems.
4. Analyze case studies using Rational Rose tool in different views i.e Use case view, logical view, component view and Deployment view.

Case studies given below should be Modeled using Rational Rose tool in different views i.e Use case view, logical view, component view and Deployment view.

CASE STUDY 1: LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned by the library that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 2: A POINT OF SALE (POS) SYSTEM

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client - side terminals and interfaces such as browser, PDA s, touch - screens.

CASE STUDY 3: AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days.

All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 4: ONLINE TICKET RESERVATION FOR RAILWAYS

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, data of journey, destination, class of train etc.The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator.There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each trai n has the three types of classes i e Sl eeper cl ass, First class and the AC compartment.Design the appli cation for the above problem description.

CASE STUDY 5: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.

The technical skill and the experience of the candidates are reviewed and the sort listed candidates are called for the interview. There may be different rounds for interview like the written test technical interview, HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed.

Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

CASE STUDY 6: DESIGN A STUDENT REGISTRATION SYSTEM

Problem Statement:

Each student has access to his or her course and grade information only and must be authenticated prior to viewing or updating the information. A course instructor will use the system to view the list of courses he or she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching, and record final grades for each student in the course(s). TA assignments will also be viewable through this system.

Instructors must also be authenticated prior to viewing or updating any information.

CASE STUDY 7: PROBLEM TITLE: ONLINE AUCTION SALES

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

REFERENCES:

1. Grady Booch, James Rum Baugh, Ivar Jacobson, *The Unified Modeling Language User Guide,* 2nd Edition, Pearson Education, 2009.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, *UML 2 Toolkit,* WILEY-Dreamtech India Pvt. Ltd, 2006.
3. Meilir Page-Jones, *Fundamentals of Object Oriented Design in UML,* Pearson Education, 2000.
4. Pascal Roques, *Modeling Software Systems Using UML2,* WILEY- Dreamtech India Pvt. Ltd, 2004.
5. Craig Larman, *An introduction to Object - Oriented Analysis and Design and Unified Process Appling UML and Patterns,* Pearson Education, 2001.

III B.Tech. II Semester

10BT61212: UNIX AND COMPUTER NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L T P C
25	50	75	- - 3 2

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Implementation of various Unix com- mands; Shell Scripting; Inter process Communication; Sys- tem Calls; File Handling operations; data link layer framing methods; Error correction techniques; Routing algorithms.

COURSE OUTCOMES:

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

1. Gain knowledge on General, text processing, file handling and network utilities.
2. Gain skills in
   - Writing shell scripts in directory maintain, simulation of head, tail and cp commands
   - Developing data link layer framing methods, Error correction techniques and routing algorithms.
3. Establish communication between processes using IPC forms.

List of Experiments

1. Study and practice various commands like tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, unmask, ulimit, ps, who, w.
2. Study and practice various commands like cat, tail, head ,

sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff.

3. a. Write a Shell Script to print all .txt files and .c files.

   b. Write a Shell Script to move a set of files to a specify directory.

   c. Write a Shell Script to display all the users who are currently logged in after a specified time.

   d. Write a Shell Script to wish the user based on the login time.

4. a. Simulate head Command.

   b. Simulate cp Command.

5. a. Write a Program to handle the Signals like SIGINT, SIGQUIT, and SIGFPE.

   b. Write a Program to create a Zombie Process.

   c. Create a Process using fork() and display Child and Parent Process Id's.

6. a. Write a Program to Lock a File.

   b. Write a Program to accept a file and Change the Permissions for the file using chmod().

7. Implement the Following IPC Forms
   a. FIFO
   b. PIPE

8. Implement the following IPC Forms
   a. Message Queue
   b. Shared Memory

9. Implement the data l ink layer framing methods such as character, character stuffing and bit stuffing.

10. Implement on a data set of characters the three CRC polynomials - CRC 12, CRC 16 and CRC CCIP.

11. Implement Dijkstra's algorithm to compute the Shortest path through a graph.

12. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm.

13. Take an example subnet of hosts. Obtain broadcast tree for it.

REFERENCES:

1. Sumitabha Das, *Your Unix The Ultimate Guide,* TMH, 2007.

2. W.R.Stevens, *Advanced Programming In The UNIX Environment,* 1st edition, Pearson Education.
3. Neil Matthew, Richard Stones, *Beginning Linux Programming,* 3rd edition, Wiley Dreamtech India (P) Ltd, 2005.

IV B.Tech. I Semester

10BT71211: WEB PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks	L T P C
25	50	75	- - 3 2

PREREQUISITES: A Course on "Object Oriented Program- ming".

COURSE DESCRIPTION: Development of static web pages using HTML: Validation of web pages using JavaScript: Stor- age and transfer of data using XML documents: Create server side applications using Servlets and JSP: Establish connec- tions to databases using JDBC.

COURSE OUTCOMES:

On successful completion of this course, the student willbe able to:

1. Gain skills on HTML for static web page design and JavaScript for validation of web page content.
2. Gain skills for designing and developing the client server web applications using the concepts of Servlets, JSP and JDBC.
3. Apply XML concepts for transferring data between web applications in real time.
4. Acquire independent problem solving in developing dynamic web applications.

LIST OF EXPERIMENTS:

1. Design the following static web pages required for an online book store web site.

A. Home Page:

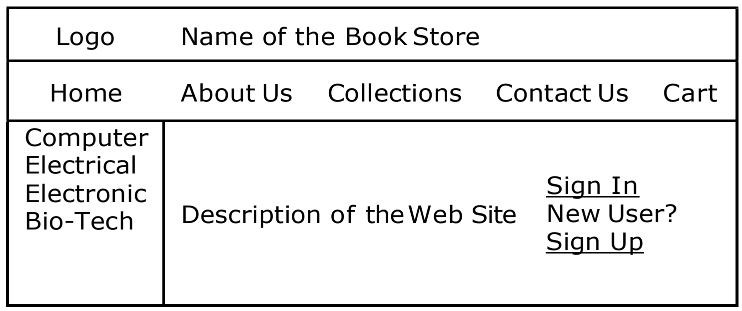
The static home page must contain the following three frames:

Top frame: Logo and the book store name and links to Home page, about us page, collections page, contact us page and cart page.

Left frame: At least four links for navigation, which will display the book catalogue of respective areas. For e.g.:

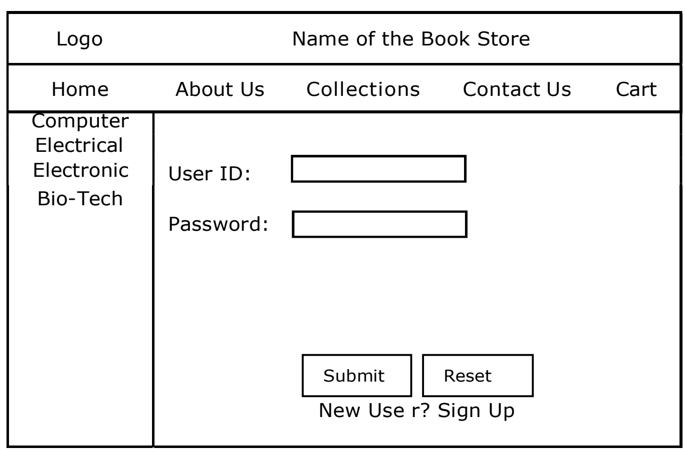
when you click the link "Computer" the catalogue for computer books should be displayed in the right frame.

Right frame: The pages of the links in the left and top frame must be loaded here. Initially it will display the description of the web site, i.e., page of the Home link will be loaded.



B. Login Page:

The login page looks like as follows (Link this page to Sign In link):



2. Design the following static web pages for an online book store web site.

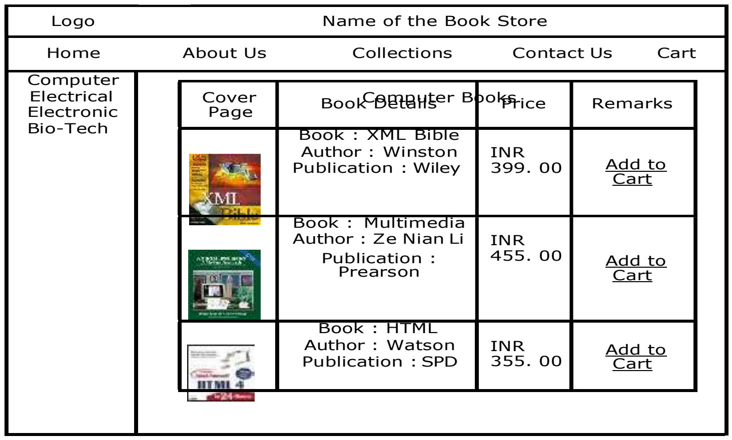
A. Catalogue Page:

The catalogue page should contain the details of books available in the web site. The details are as follows:

a. Snap shot of cover page b. Text book name

c. Author name d. Publisher

e. Price f. Add to cart link.



B. Registration Page:

Design the Registration page with the following fields (Link this page to Sign Up link).

a. First Name b. Last Name
c. User ID d. Password
e. Confirm Password f. Gender
g. Date of Birthh. Address i. Postal Code
j. Linguistics k. Mobile No.
l. Email-ID

C. Cart Page:

Logo	Name of the Book Store			
Home	About Us	Collections	Contact Us	Cart
Computer Electrical Electronic Bio-Tech	**Selected Books** Book Name / Price / Quantity / Amount XML bible / 399.00 / 2 / INR 798.00 HTML / 355.00 / 1 / INR 355.00 **Total amount (INR): 1153.00**			

3. Write a JavaScript code to validate the following fields of the registration page.

   a. First Name/Last Name - should contain only alphabets and the length should not be less than 3 characters.

b. User ID - It should contain combination of alphabets, numbers and _. It should not allow spaces and special symbols.
c. Password - It should not be less than 8 characters in length.

4. Write a JavaScript code to validate the following fields of the registration page.
    a. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.
    b. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.
    c. E-mail id - It should allow the mail id with the following format:
       Ex. mailid@domainname.com

5. Apply the following styles to static pages of online book store web site using CSS (Cascading Style Sheets):
    a. Fonts and Styles: font-family, font-style, font-weight and font-size
    b. Backgrounds and colors: color, background-color, background-image and background-repeat
    c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align
    d. Borders: border, border-width, border-color and border- style
    e. Styles for links: A:link, A:visited, A:active, A:hover
    f. Selectors, Classes and Layers.

6. Write an XML file which includes the following:

a. Title of the book	b. Author of the book
c. ISBN number	d. Name of the publisher
e. Edition	f. Price

i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.
ii. Display the contents of the XML file with the following format using XSL.

The contents should be displayed in a table. The header of the table should be in color grey, and the author names should be displayed in red color, bold and capitalized.

Use your own colors for remaining fields.

7. a. Deploy web pages of online book store web site using Apache Tomcat web server and then navigate them thorough the default port number of the tomcat web server.

   b. Write a Java Servlet program for displaying the system date.

   c. Write a Java Servlet program to red user name and his/her favorite color from the html form. Dsplay the name of the user in green color and set user favorite color as a background color to the web page.

8. Write a Java Servlet program to read the user id and password entered in the Login form and authenticate with the values (user id and passwords) available in the cookie and web.xml file. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by user id otherwise you should display a message stating that you are not an authorized user. Use the following methods for storing user id's and passwords:

a. Using Cookes - Assume four user id's user1, user2, user3 and user4 and their passwords pwd1, pwd2, pwd3 and pwd4 respectively. Create four cookies on four user id's and passwords.

b. Initialization Parameters in web.xml - Store the user id's and passwords in the web.xml file and access them through the servlet by using the getInitParameters() method.

9. Write a Java Servlet or JSP to store user details (entered in the Registration Form) into the database using JDBC. Use any RDBMS as backend for storing user details.

10. Write a Java Servlet or JSP to authenticate the user by reading user id and password entered in the Login form. Compare User id and password values with user id's and passwords stored at database. If he/she is a valid user (i.e., user id and password match) you should welcome him/her by name (first name + last name), otherwise you should display a message stating that you are not an authorized user.

11. a. Write a Java program for storing books details like Name of the text book, author, publisher, edition and price into the database using JDBC. Store books in database based on the category (i.e., Computer/Electrical/Electronic/Bio-Tech).

    b. Write a Java servlet or JSP for updating catalogue page to extract books details from the database and then display them in tabular format using JDBC.

12. HTTP is a stateless protocol. Session is required to maintain the state. The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time (i.e., from different systems in the LAN using the IP-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated. Modify your catalogue and cart pages to achieve the above mentioned functionality using sessions.

IV B.Tech. I Semester

10BT71212: MULTIMEDIA AND APPLICATIONS DEVELOPMENT LAB

Int. Marks	Ext. Marks	Total Marks	L T P C25
	50	75	- - 3 2

PREREQUISITES: Courses on 'Object Oriented Programming' and 'ComputerGraphics'

COURSE DESCRIPTION: Animating Flash Movies and Devel- oping ActionScript Applications using a Flash Tool.

COURSE OUTCOMES:

On successful completion of this course, the student willbe able to:

1. Gain skills in flash animation techniques and ActionScript programming to develop flash movies.
2. Design and develop various user authoring applications, multimedia games and animation movies using flash tool.
3. Apply various ActionScript programming principles to animate interactive flash movies for presenting multimedia content more efficiently.
4. Create novel multimedia applications independently.

THE FOLLOWING EXPERIMENTS ARE TO BE DEVELOPED USING ADOBE FLASH TOOL:

1. Draw an object and apply the following animation techniques:
   a. Motion Tween b. Rotaion
   c. Shrink and Grow d. Shape Tween
   e. Add Guide Layer
2. a. Animate a Flash movie that shows the truck moving behind the trees.
   b. Animate a Flash movie that shows the Flag hoisting.
3. a. Animate a Flash movie that shows the Spotlight Masking. Use text as a masked object and circle as a mask object.

b. Create a Flash movie that shows the complete word will appear on the stage from letters that fly in from various points. Use graphical text while animating the movie.

4. Animate a Flash movie that shows rolling wheels on a moving vehicle. Create a movie clip symbol of a rolling wheel and then add two instance of that symbol to the vehicle. Apply motion tween to make the vehicle drive across the road.

5. Create a Flash movie that enables the user to click left and right arrow buttons to view the images of the Movie Clip in left and right directions respectively. Initially add a set of images to the Movie Clip and then view the images of the Movie Clip through the buttons by writing necessary action script code.

   Note: Left and Right arrow buttons should be created by the user.

6. Create a Flash movie that accepts User Id and Password from the user. Validate User Id and Password fields whenever the user presses the submit button. If a user id and password are correct display a welcome message otherwise display a message as invalid user. Store different user's user id's and passwords using an array object.

7. Create a Flash movie that allows the user to control the movement of the movie clip through the keyboard. Once the user presses the Left, Up, Right and Down arrow keys of the keyboard, the movie clip should move in Left, Upward, Right and Downward directions respectively. Make sure that, the movie clip will move in a specified boundary of the stage.

8. Write an Action Script application to sort N integer array elements.

9. Write an Action Script application to display Movie Clip's randomly.

10. Write an Action Script application to determine points along a circle.

11. Write an Action Script application to perform the following operations.

    a. Drawing a Line   b. Drawing a Curve

    c. Drawing a Rectangle d. Filling a shape with specified color

    e. Filling a shape with gradient color

12. Write an Action Script application to apply the mask to an image.

13. Write an Action Script application to convert Indian currency to foreign currency.

14. Write an Action Script application to link MovieClip symbol with

subclass of MovieClip class by using linkage property.

15. Write an Action Script application to design/validate the User Registration form.

III B.Tech. I Semester

10BT50311 : MACHINE TOOLS LAB

Int. marks	Ext. marks	Total marks	L	T	P	C
25	50	75	0	0	3	2

PRE-REQUISITES:
Metal cutting and Machine Tools

COURSE DESCRIPTION:
Hands on practice on machine tools such as Lathe, milling machine, drill press, power saw, surface grinder and other machine shop.

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

CO1. Employ knowledge of different machine tools used in machine shop.
CO2. Analyze machine tool problems and offer a qualitative assessment on problem solutions.
CO3. Identify different manufacturing techniques to produce complex shapes.
CO4. Manufacture simple parts using lathe/milling/drilling/shaper and other allied machine tools.

DETAILED SYLLABUS:

Any TWELVE experiments to be conducted

1. Demonstration of construction & operations of general purpose machines: Lathe, Drilling machine, Milling machine, Shaper, Planing machine, Slotting machine, Cylindrical Grinder, Surface grinder and Tool & cutter grinder.
2. Step turning operation.
3. Taper turning operation.
4. Eccentric turning operation.
5. Right hand threading.
6. Square threading.

7. Multiple operations on capstan lathe.
8. Drilling, reaming and tapping & external threading using die.
9. Shaping and planing operations.
10. Slotting operation.
11. Cylindrical surface grinding operation.
12. Gear cutting operation.
13. End milling operation.
14. Surface grinding and Centerless grinding operation.
15. Grinding of tool angles on a cutting tool.

III B.Tech. I Semester

10BT50312 : THERMAL ENGINEERING LAB

Int. marks	Ext. marks	Total marks	L	T	P	C
25	50	75	0	0	3	2

PRE-REQUISITES:

Engineering Thermodynamics, Thermal Engineering-I, Thermal Engineering-II

COURSE DESCRIPTION:

Assembling and dissembling of an automobile models; Finding performance parameters of 2-strole and 4- stroke engines; Heat balancing of an engine; Valve and port timing diagrams; Determining friction power for single - Cylinder and multi - Cylinder engines; Determining Fuel properties; Compressor performance.

COURSE OUTCOMES:

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

CO1. Employ the practical knowledge in finding performance of 2-stroke, 4- stroke I.C engines and multi stage reciprocating compressor.

CO2. Analyze the variations of engine performance parameters and changes in compression ratio on load.

CO3. Provide solutions to low cost and high power automobile engines.

CO4. Identify the manageable areas in an I.C engine to reduce heat losses and emissions of COx, NOx and Sox.

DETAILED SYLLABUS:

Any TWELVE experiments are to be conducted

1. Valve / Port Timing Diagrams of an I.C. Engine.
2. Performance Test on a 4 -Stroke Diesel Engine.
3. Performance Test on 2-Stroke Petrol engine.
4. Evaluation of Engine friction by conducting Morse test on 4-Stroke Multi cylinder Engine.

5. Retardation and motoring test on 4- stroke engine.
6. Heat Balance of an I.C. Engine.
7. Air/Fuel Ratio and Volumetric Efficiency of an I.C. Engine.
8. Performance Test on Variable Compression Ratio Engines, economical speed test.
9. Performance Test on Reciprocating Air – compressor Unit.
10. Study of Boilers.
11. Determination of flash and fire points of various fuels and lubricants using Abel's, Pensky Martin's and Cleveland's apparatus.
12. Dismantling / Assembly of Engines to identify the parts and their position in an engine.
13. Determination of calorific value of solid and liquid fuels using Bomb calorimeter.
14. Determination of calorific value of gaseous fuels by using Junker's colorimeter.
15. Flue gas analysis by Orsat's, and latest electronic instruments.

III B.Tech. II Semester

10BT60311 : HEAT TRANSFER AND DYNAMICS LAB

Int. marks	Ext. marks	Total marks	L	T	P	C
25	50	75	0	0	3	2

PRE-REQUISITES:
Engineering Mathematics, Thermodynamics, Fluid mechanics, Dynamics of Machinery

COURSE DESCRIPTION:
Experimental studies on mechanisms of heat transfer; Film wise and drop wise condensation; Steady and unsteady flow; Effectiveness of heat exchanger; Investigation on various thermal properties such as conductivity, emissivity, Stefan - Boltzmann constant; Lateral, longitudinal, torsional vibrations; governors and gyroscopic effect.

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

CO1. Devise experimentation schemes for estimating heat transfer rates in conduction, convection, radiation heat transfer and select scenarios in dynamic machinery.
CO2. Estimate the approximate imbalance in machines and approximate heat transfer requirements
CO3. Provide probable solution for heat transfer and dynamics related routine problems.
CO4. Provide experimentation schemes for sub-systems of a complex machine or thermal equipment to predict the characteristics of a complex system.

DETAILED SYLLABUS:
Any SIX experiments from each part are to be conducted

PART-A: HEAT TRANSFER LAB

1. Thermal conductivity of metal rod.
2. Overall heat transfer co-efficient through Composite Slab Apparatus.
3. Thermal conductivity of insulating powder material through concentric sphere apparatus.
4. Thermal conductivity of insulating material through lagged pipe apparatus.

5. Experiment on transient heat conduction.
6. Heat transfer coefficient in natural convection.
7. Heat transfer coefficient in forced convection.
8. Experiment on Critical Heat flux apparatus.
9. Heat transfer in drop and film wise condensation.
10. Study of heat pipe and its demonstration.
11. Study of two phase heat flow.
12. Emissivity of a gray body through Emissivity apparatus.
13. Experiment on Stefan Boltzmann Apparatus.
14. Heat transfer in pin-fin.
15. Experiment on Parallel and counter flow heat exchanger.

NOTE: Thermal Engineering data books are permitted in the examinations.

PART-B: DYNAMICS LAB

1. Test on Gyroscopic Unit.
2. Test on Universal Governor.
3. Test on Static and Dynamic balancing apparatus.
4. Test on Balancing of Reciprocating Masses.
5. Test on Critical Speed Analyzer.
6. Test on Vibration Test Rig.
7. Test on Cam Apparatus.
8. Shaft alignment testing.
9. Whirling of Shaft Apparatus.
10. Determination of pressure distribution in journal bearing.
11. Determination of moment of inertia of connecting rod.

NOTE: Internal and End examinations evaluation will be done separately and the average will be recorded.

III B.Tech. II Semester

10BT60312:**CAD/CAM LAB**

Int. marks	Ext. marks	Total marks	L	T	P	C
25	50	75	0	0	3	2

PRE-REQUISITES:
Computer Aided Engineering Drawing

COUSRE DESCRIPTION:
Fundamental Concepts of CAD/CAM; 2D and 3D Geometric Constructions; CREO, ANSYS; CNC Code Generation.

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

CO1. Use software package CREO to generate 3D models of parts and assemblies, and choose appropriate module of ANSYS to perform stress analysis and identify the machine codes for developing CNC part programs to produce the parts.

CO2. Analyze and Manufacture in a standardized manner suitable for industrial scenarios.

CO3. Design Components and Develop part programs for mechanical components involving simple features.

CO4. Identify simpler subsystems in a complex subsystem and employ bottom-up approach to build the model of the entire system and generate drawings or models.

CO5. Implement appropriate hardware and software for CAD/CAM thereby enhancing productivity in design.

DETAILED SYLLABUS:

1. Exercises(2D & 3D) using design packages (any three exercises from each section to be conducted)
   - (a) Drafting: Development of part drawings for various components in the form of orthographic and isometric, Representation of dimensioning and tolerances scanning and plotting.
   - (b) Part Modeling: Generation of various 3D models through protrusion, revolve, shell sweep, Creation of various features, Study of parent child relation, Feature based and Boolean based modeling surface and assembly modeling, Study of various standard translators, Design of simple components.

2. Exercises using analysis software
   a. Determination of deflection and stresses in 2D and 3D trusses and beams.
   b. Determination of deflection component and principal and Von-Mises stresses in plane stress, plane strain and axisymmetric components.
   c. Determination of stresses in 3D and shell structures (at least one example in each case)
   d. Steady state heat transfer Analysis of plane and axisymmetric components.

3. Exercises on CNC machines(any four exercises to be conducted)
   a. Development of process sheets for various components based on tooling Machines.
   b. Study of various commands (Geometry, Post, Pre-processor, Auxiliary)to control the NC Machines.
   c. Machining of simple components on CNC lathe
   d. Machining of simple components on CNC Milling machines.
   e. Machining of simple components on CNC machines by transferring NC Code from a CAM package through RS 232.
4. Experimentation and simulation of a robot.

Any Six Software Packages from the following:
Use of AutoCAD, Micro Station, CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, MasterCAM etc, Hypermesh.

IV B.Tech. I Semester

10BT70313 : METROLOGY AND MEASUREMENTS LAB

Int. marks	Ext. marks	Total marks	L	T	P	C
25	50	75	0	0	3	2

PRE-REQUISITES:
10+2 Physics, Engineering Physics, Machine Drawing, Machine tools

COURSE DESCRIPTION:
Need of high precision Metrology and various techniques available with emphasis on standardization; Calibration of instruments such as Vernier calipers, Micrometer, Vernier height gauge etc. by using standard slip gauges; Measure dimensions of shafts, bearings &some other components in metric and imperial units using linear and angular measuring instruments; Alignment tests on lathes and milling machines; Straightess and flatness measurements by using spirit-level and auto collimeter;Identifying uncertinities in dimensional metrology by calculating errors ;Measurement of gear and threaded profiles by profilometer and toolmakers microscope; study of bordan pressure gauge, LVDT and other instruments; piezoelectric and capacitive transducers.

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

CO 1: Choose correct measurement tools and /or measurement systems in a practical situation.

CO 2: Identify sources of measurement errors and eliminate them.

CO 3: Use common and advanced Metrology and measurement appliances which are commonly used in industrial inspection process and specify a dimension validation process.

CO 4: Measure surface roughness by precision measuring instruments such as SJ 210 roughness tester, Autocollimator and Calibrate instruments and/or measurement systems using known standards.

DETAILED SYLLABUS:
Any SIX experiments from each part are to be conducted
PART-A: METROLOGY LAB

1. Measurement of lengths, Heights, Diameters, Internal bores by Vernier, Micrometer, Internal micrometer and dial bore indicators.
2. (a) Measurement of angle and taper by using Bevel protractor, sine bars.
   (b) Measurement of angle of taper plug gauge, Taper ring gauge, V- groove, Radius of given ring by using spheres and height

gauge.

3. (a)Measurement of straightness and flatness using autocollimator.

   (b) Measurement of coordinates of a jig plate.

4. (a) To find module, Addendum, Dedendum, Pitch circle diameter, Tooth width, Pressure angle of a given spur gear by using gear teeth vernier

   (b) Measurement of effective diameter of an external thread by using Two Wire/Three wire method.

5. (a) Study of screw thread profile using Tool Makers microscope.

   (b) Measurement of gear elements using profilometer.

6. (a) Measurement of straightness and flatness using spirit level and Autocollimator.

   (b) Measurement of surface measurement by using Talysurf instrument.

7. Checking the limits of dimensional tolerances using comparators (Mechanical/Pneumatic/Electrical)

8. (a) Alignment test on lathe machine

   (b) Alignment on milling machine

PART-B: MEASUREMENTS LAB

1. Study of Instruments.
2. Calibration of Bourdon Pressure Gauge.
3. Calibration of transducer for temperature measurement (RTD).
4. Study and calibration of LVDT transducer for displacement measurement.
5. Calibration of strain gauge for load measurement.
6. Calibration of capacitive transducer for angular displacement.
7. Study and calibration, measurement of speed pickups using Stroboscope.
8. Study of Piezo electric transducer.

NOTE: Internal and End examinations evaluation will be done separately and the average will be recorded.

IV B.Tech. I Semester

10BT70314 : MANUFACTURING SYSTEMS LAB

Int. marks	Ext. marks	Total marks	L	T	P	C
25	50	75	0	0	3	2

PRE-REQUISITES:
Industrial Engineering and Management, CAD/CAM and Operation Research

COURSE DESCRIPTION:
Modeling and simulation of conventional and advanced manufacturing systems; introduction to simulation softwares like Promodel, Arena, Lingo, SPSS, SAS and other softwares in order to demonstrate, predict and measure system strategies for effective, efficient and optimized performance of manufacturing systems.

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

CO 1: Employ knowledge of the methodologies of designing and simulating a manufacturing system for prediction of performance under various constraints.
CO 2: Analyze different industrial systems, identify the problems, formulate and model the problems, and find solutions to these problems using simulation.
CO 3: Model real life industrial systems using computer simulation methodologies and identify the bottlenecks.

DETAILED SYLLABUS:

1. Solving LPP, Transportation, assignment problems using excel solver and OR packages.
2. Solving inventory, scheduling lot sizing problems using manufacturing systems simulation software
3. Solving queuing problem and layout optimization using manufacturing systems simulation software
4. Building simulation models for manufacturing operations with layout and transport system.
5. Project evaluation and review based on time and cost

6. Weibull reliability plot creation using component / product failure data
7. Line balancing using manufacturing systems simulation software
8. Current state and future state mapping using value stream mapping software
9. Process capability studies using statistical software
10. Analysis of DoE results using statistical software
11. Statistical Analysis of Simulation models (input analysis)
12. Statistical Analysis of Simulation models (output analysis)
13. 5S practice / Poke Yoke for workplace improvement
14. Design and simulation of a simple manufacturing system using ProModel software.
15. Design and simulation of a simple manufacturing system using Arena software.

At least one software package(s) from each area to be practiced

(a) Statistics : SYSTAT/MINITAB/SPSS/SAS
(b) Simulation : ARENA/ProModel/QUEST/WITNESS
(c) OR packages : LINGO/EXCEL SOLVER/SIGMAPLOT

IV B. Tech. – II Semester

10BT81511: COMPREHENSIVE VIVA-VOCE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
100	-	100	-	-	-	2

PREREQUISITES: All courses of the program.

COURSE DESCRIPTION:

Assessment of student learning outcomes.

COURSE OUTCOMES:

Comprehensive Viva-Voce enables a successful student to

1. Demonstrate knowledge in the program domain.
2. Present his views cogently and precisely.
3. Exhibit professional etiquette suitable for career progression.

IV B. Tech. - II Semester
10BT81512: **PROJECT WORK**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
75	150	225	-	-	12	12

PREREQUISITES: All the courses of the program up to IV B. Tech. – I Semester.

COURSE DESCRIPTION:
Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Preparation of thesis and presentation.

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

1. Acquire in-depth knowledge in the areas of interest.
2. Analyze critically chosen problem for conducting research and developing a project.
3. Design solutions through knowledge gained, for solving problem efficiently.
4. Undertake research and solve real world problems in the project domain.
5. Use the appropriate techniques, resources and modern engineering tools necessary for mini-project work.
6. Apply project results for sustainable development of society.
7. Understand the impact of project results in the context of environmental sustainability.
8. Understand professional and ethical responsibilities for sustainable development of society in chosen field of project.
9. Perform harmonically in multi-cultural groups, and develop a high level of interpersonal skills.
10. Develop communication skills, both oral and written for preparing and presenting reports.
11. Manage projects in respective disciplines and multidisciplinary environments with due consideration to cost and time efficiency.
12. Engage in lifelong learning to improve knowledge and competence continuously.