COURSE STRUCTURE

&

SYLLABUS
(3rd – 8th SEMESTER)

FOR B.TECH PROGRAMME
IN
INFORMATION TECHNOLOGY

BIJU PATNAIK UNIVERSITY OF TECHNOLOGY ORISSA,
ROURKELA

2007 - 2008

COURSE STRUCTURE
SECOND YEAR B.TECH PROGRAMME
INFORMATION TECHNOLOGY

3rd Semester				**4th Semester**			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
BSCM 2201	Mathematics - III	3-1-0	4	BSCM 2202	Mathematics - IV	3-1-0	4
CPES 5201	NetworkTheory/	3-1-0	4	BENG 1201	Electrical Machines	3-1-0	4
BENG 1208	Fluid Mechanics & Hydraulic Machines				or		
	or			CPES 5201	Network Theory /		
BENG 1201	Electrical Machines			BENG 1208	Fluid Mechanics & Hydraulic Machines		
BSCP 2201	Physics - II	3-0-0	3	BSCC 2201	Chemistry - II /	3-0-0	3
BSCP 2202	Physics of Semi-Conductor Devices /			BSCC 2202	Material Sciences		
	or				or		
BSCC 2201	Chemistry - II /			BSCP 2201	Physics - II		
BSCC 2202	Material Sciences			BSCP 2202	Physics of Semi-Conductor Devices /		
BCSE 3201	Object Oriented Programming	3-0-0	3	BCSE 3202	Relational Database Management System	3-0-0	3
HSSM 4201	Engineering Economics & Costing	3-0-0	3	HSSM 4202	Organisational Behaviour	3-0-0	3
	or				or		
HSSM 4202	Organisational Behaviour			HSSM 4201	Engineering Economics & Costing		
CPES 5202	Analog Electronics Circuit	3-1-0	4	CPES 5203	Digital Electronics Circuit	3-1-0	4
	Total		**21**		**Total**		**21**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
BENG 9202	Basic Electronics Laboratory	0-0-3	2				
	or			BENG 9201	Basic Electrical Engineering Laboratory	0-0-3	2
BENG 9201	Basic Electrical Engineering Laboratory				or		
BCSE 9201	Computer Lab (OOP)	0-0-3	2	BENG 9202	Basic Electronics Laboratory		
BENG 9203	Mechanical Engineering Lab.	0-0-3	2	BCSE 9202	Computer Laboratory (RDBMS)	0-0-3	2
	or			CPES 9201	Network & Devices Laboratory	0-0-3	2
CPES 9201	Network & Devices Laboratory						2
CPES 9202	Analog Electronics Laboratory	0-0-3	2		or		
				BENG 9203	Mechanical Engineering Lab.		
			8	CPES 9203	Digital Electronics Laboratory	0-0-3	2
							8
Total			**28**	**Total**			**28**

L-Lecture **T-Tutorial** **P-Practical**

3rd Semester

BSCM 2201 MATHEMATICS - III (3-1-0)

Module - I (9 Lectures)

Partial differential equations : The vibrating string. The wave equation & its solution.

The Heat equation and its solution

Module - II (10 Lectures)

Two - dimensional wave equation and its solution.

Laplace equation in polar, cylindrical and spherical coordinates. Potential.

Module - III (13 Lectures)

Complex analysis : Complex numbers and functions conformal mappings

Complex integration. Cauchy's Theorem Cauchy's integral formulas.

Module - IV (8 Lectures)

Taylor's and Laurent's series, Residue theorem, evaluation of real integrals.

The Course covered by : Advance Mathematics by E. Kreyszig, John Wiley & Son's (P) Ltd. (8th Edition)
Chapter 11 (except 11.6)
Chapter 12, 13, 14, 15

CPES 5201 NETWORK THEORY (3-1-0)

MODULE - I (12 hours)

Topological description of networks; Reviews of mesh & nodal analysis. Reciprocity & Millman's theorem, Maximum power transfer theorem.

Q factor, Bandwidth and Selectivity in Series & parallel resonance Circuits.

Coupled Circuits : Dot Convention for representing coupled circuits, coefficient of coupling.

Loop Analysis of coupled circuits, single and double tuned coupled circuits Transiet study in RLC networks by Laplace transform method with DC and AC excitation.

Response to step, impulse and ramp inputs S - domain circuits

Two Port networks : Z, Y, h, & ABCD representation of T and TT2 - port networks both in transmission parameters T - TT networks, 2 port network, Cascade and Parallel Connections.

Image and iterative impendances.

MODULE - II (12 hours)

Network Functions & Responses :

Concept of complex frequency, driving point and transfer functions for one port and two network, poles & zeros of network functions, Restriction on Pole and Zero locations of network function. Impulse response and complete response. Time domain behaviour form pole-zero plot.

Filters : Design of low pass, high pass, band pass & band elimination filters. Active filters. Input Power, Power Transfer and Insertion loss.

Problems in Optimizing power transfer; Insertion loss.

MODULE - III (10 hours)

Fourier Series & Fourier Transforms : Fourier Series representation of non sinusoidal waves. Discrete spectra, rms values of non sinusoidal waves, Steady state response of linear circuits to non

sinusoidal waves, power in such circuits. Fourier Internal and Fourier transform of signum and step functions. Applications to RL and RC circuits.

Network Synthesis :

Driving point functions, properties of positive real function.

MODULE - IV (8 hours)

Foster's reactance Theorem, Synthesis of LC, RC and RL networks by Cauer - I, Cauer - II, Foster - I, & II forms. Synthesis of active filters - Butterworth and Chebyshev Techniques.

TEXT BOOKS

1. Network Analysis : M.E Van Valkenbrg
2. Network Analysis & Synthesis : Franklin F. Kua Second Edition

REFERENCE BOOKS :

1. A Course in Electrical Circuits and Analysis : M. L. Soni, J. C. Gupta
2. Network Synthesis : M. E. Van Valkenberg
3. Eloectrical Networks : Alexander & Sadiku

BENG 1208 - FLUID MECHANICS AND HYDRAULIC MACHINE (3-1-0)

Module – I (12 hours)

Introduction : Scope of fluid mechanics and its development as a science

Physical property of Fluid

Density, specific gravity, specific weight, specific volume, surface tension and capillarity, viscosity, compressibility and bulk modulus, Fluid classification.

Fluid static

Pressure, Pascal's Law, Pressure variation for incompressible fluid, atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure, monometer.

Hydrostatic process on submerged surface, force on a horizontal submerged plane surface, force on a vertical submerged plane surface.

Module – II (12 hours)

Buoyancy and flotation, Archimedes' principle, stability of immersed and floting bodies, determination of metacentric height.

Fluid kinematics : Introduction, description of fluid flow, classification of fluid flow. Acceleration of fluid particles, flow rate and continuity equation, differential equation of continuity.

Fluid dynamics : Introduction, Euler's equation along a streamline, energy equation, Bernoulli's equation, Analysis of finite control volumes and its application to siphon, venture meter, orifice meter

Module – III (6 hours)

Turbine : Classification, reaction, Impulse, outward flow, inward flow and mixed flow turbines, Francis & Kaplan turbines, Pelton wheel, Physical description and principle of operation, Governing of Turbine.

Module – IV (8 hours)

Centrifugal Pump : Principles of classification, Blade angles, Velocity triangle, efficiency, specific speed, characteristics curve.

Reciprocating Pump : Principles of working, slip, work done, effect of acceleration and frictional resistance, separation

Tex Books

1. Fluid Mechanics, A.K. Mohanty, PHI

2. Introduction to Fluid Mechanics and Fluid Machines, S.K. Som and G. Biswas, TMH
3. Fluid Mechanics, Modi & Seth

BENG 1201 ELECTRICAL MACHINES (3-1-0)

Module I (10 Lectures)

D.C Mechanics :

D.C Generator – construction and principle of operation, E.M.F. equation ; types of generator; no load and load characteristics; Voltage build-up of shunt

Generator; voltage regulation, Application.

D.C Motor –construction and principle of operation ; back E.M.F; torque and speed equations; characteristics and performance curves; speed control of series and shunt motors; motor starters; industrial application.

Losses and Efficiency of D.C machines.

Module II (10 Lectures)

Transformer:

Single phase – construction and principle of operation; E.M.F. equation; Phasor diagram; actual and approximate equivalent circuits; open and short circuit tests, voltage regulation; losses and efficiency.

Three Phase – Construction and principle of operation; connection of three single –phase units in wye, delta, open delta configurations; Autotransformer; conventional transformer connected as Autotransformer. Special Transformers – induction heating and high impedance and high frequency transformer.

Module III (10 Lectures)

Synchronous Machines :

Three- phase alternators – construction and principle of operation; E.M.F. equation; distribution and pitch factors; Synchronous reactance; performance of alternators on no-load and load; Phasor diagram; voltage regulation, power calculations of turbine and hydro-generators,; synchronization of a generator.

Three-Phase Synchronous Motor- construction and principle operation; V- curves; Phasor diagram; methods of starting; applications.

Module IV (10 Lectures)

Three-Phase induction Motor- construction of slip ring and squirrel cage type induction motors; Phasor diagram and equivalent circuit; torque-slip characteristics; maximum torque calculations; open and short-circuit tests; losses and efficiency; starting of induction motors; speed control; Induction generator.

Single-Phase Induction Motor- construction and principle of operation; capacitor- start and capacitor-run motors; Universal motor; Stepper motors.

Books :

1. Electrical Machines, Drives and Power Systems, 5th edition by Theodore Wildi (Pearson) : Text.
2. Electrical Machinery by A.E. Fitzerald and Charles Kingsley, Jr., and S.D. Umans, Tata McGraw Hill Publication.
3. Principles of Electric Machines by V.K Meheta and R. Meheta , S. Chand Publication.

BSCP 2201 PHYSICS - II (3-0-0)

This one semester Physics course is divided into four units. The unit - I deals with some aspects of nuclear physics, unit - II introduces certain features of condensed matter physics, unit - III

deals with certain aspects of semiconductors and superconductors and unit - IV introduces Opto-electronic devices and fibre-optic communication system.

Unit - 1

This unit covers the basic principles and applications of different types of accelerators and their important applications.

Detailed constructional features of accelerators are not necessary.

1. Need for nuclear accelerators.
2. D.C. Accelerators : Cockcroft - Walton, Van de Graff, Tandem accelerators.
3. RF accelerators : Linear accelerator, cyclotron, electron accelerator, betatron.
4. Application of nuclear accelerators - production of radioisotopes, radiation processing of materials, medical applications.

Unit - 2

This Unit deals with diffraction in crystals and its role in determining crystal structure.

Study of crystal structure by diffraction methods, Bragg's condition for crystal diffraction, Lau condition, Miller indices, Reciprocal lattice, Geometrical structure factor, Atomic form factor.

Unit - 3

This unit deals with certain features of semiconductors and superconductors.

1. Energy bands in solids: Kronig - Penny model, allowed bands and forbidden gaps, elemental and compound semiconductors.
2. Superconductivity : Superconductors and their properties, Meisner effect, Type - I and Type - II Superconductors, Thermodynamic properties of superconductors, London equation, Application of superconductors.

Unit - 4

This unit introduces some Opto - electronic devices and fibre - optic communication system.

Laser : Principle of lasing, properties of Laser, construction and working of semiconductor laser, Application of laser.

LED : Principle construction of operation and application, Introduction to fibre optics, basic characterstics of optical fibres, optical fibre communication system.

Books Recommended :

1. Nuclear Physics, P. R. Roy & B. P. Nigan
2. Particle Accelerators, M. S. Livingston & J. P. Blewett
3. Concepts of Modern Physics, A. Beiser
4. Introduction to Solid State Physics, C. Kittel
5. Introduction to Lasers, A. Avadhnulu
6. Physics - II, B. B. Swain and P. K. Jena.

BSCP 2202 PHYSICS OF SEMICONDUCTOR DEVICES (3-0-0)

Module I (9 hours)

An appreciation of Quantum Mechanics in determining electrical properties of semiconductor.

The Semiconductor in Equilibrium :

Equilibrium distribution of electrons & holes, the n0 and p0 equation, intrinsic carrier concentration; Do pant atoms and energy levels, ionization energy; the extrinsic semiconductor, the n0 p0 product, position of Fermi-energy level, variation of EF with doping concentration and temperature.

Carrier Transport Phenomena :

Carrier drift: mobility, conductivity, velocity saturation:

Carrier Diffusion: Diffusion current density. Total current density. The Einstein relation.

Module II (9 hours)

Non-equilibrium Excess Carrier in Semiconductor

Excess carrier generation and recombination, characteristics of excess carriers-continuity equation and time – dependent Diffusion equation. Ambipolar Transport – Derivation of equation and applications.

The Pn junction and Diode

Basic structure, built-in potential barrier, Electric field, space charge width; Reverse applied bias-space charge width and Electric field. Junction capacitances.

Pn junction Diode : Ideal – current voltage relationship, Minority Carrier distribution, Ideal Pn junction currents under forward and reverse bias.

Module III (9 hours)

Pn junction diode (contd.):

Temperature effects, Small signal model of Pn junction, Equivalent circuits Recombination Current. Junction Breakdown.

Metal-Oxide- Semiconductor FET (MOSFET)

The MOS structure : Energy band diagrams, Depletion Layer thickness, Work function difference, Flat band Voltage, Threshold Voltage, Charge distribution, Capacitance –Voltage characteristics.

The basic MOSFET operation, Current –Voltage relation (Concepts)

Frequency limitation : Small signal Equivalent circuit.

The CMOS Technology.

Module IV (8 hours)

The Bipolar Transistor

Basic Principle of Operation., Simplified Transistor Current Relation. Modes of operation, Amplification with Bipolar transistors, Minority Carrier distribution Forward active mode, other modes of operation. Low Frequency Common Base Current gain,. Non-ideal effects –Base width Modulation, Breakdown Voltage. Equivalent Circuit Models –Eber's –Moll Model, Hybrid- Pi model. Frequency limitation. Large Signal Switching characteristics.

Text Book :

1. Semiconductor Physics and Devices- Basic Principles BY Donald A. Neamen, 3rd Edition, Tata McgrawHill Edition. (Selected portion from chapters 2,4,4,6,7,8,10 &11.)

For additional reading :

2. Solid state Electronics Devices – y Ben G. Strectman and Sanjay Benerjee, 5th Edition, Pearson Edu.

BSCC 2201 CHEMISTRY - II (3-0-0)

Module I (12 Lectures)

(To develop awareness about Water Treatment)'

Water quality parameters and standards.

Hardness of Water : Types of hardness, Units of hardness, Determination of hardness. Disadvantages of hardwater, acidity and alkalinity, Water Softening Techniques. Boiler feed water, Water for Domestic purposes (municipal / Drinking Water)

Module II (10 Lectures)

(To develop the basic concepts about the transition metal compounds and corrosion)

1. Corrosion:

   Dry and wet corrosion, Galvanic Corrosion, Stress Corrotion, Factors affecting corrosion, Corrosion Control : (Proper design and fabrication procedure, Cathodic protection, Passivation).

   (8 Lectures)

2. Polymers:

   Nomenclature and classification, Thermoplastic and thermosetting resins, Some typical useful polymers:Polyethylene,PVC, polystyrene, PMMA, Nylon 6:6, Nylon 6, Bakelite, Terylene, Silicones. Natural and synthetic rubbers: Neoprene, Butyl and Polyuarethane rubber, Vulcanization.

   (8 Lectures)

Module III (10 Lectures)

(To introduce the students about the basic concepts of fuels)

1. Fuels:

   Classification of fuels, calorific value, Analysis of Coal and Coke, Refining of Crude oil, Fractional distillation, Cracking, Knocking and antiknocking, Octane and Cetane number.

   Gaseous Fuel : Prodcer gas, Water gas, LPG & CNG.

   Cobustion Calculation.

Module IV (10 Lectures)

(To develop awareness amongst the students about the importance of water quality in domestic and industrial world and concepts of various kinds of pollutions)

1. Water Treatment:

   Water quality parameters and standards, treatment of water for industrial and domestic purpose.

2. Environment pollution:

   Green house effect, acid rain, depletion of ozone layer; Water pollution- bio chemical effect of lead, arsenic, mercury and fluorides, sewage-B.O.D. and C.O.D.

Books :

1. Organic Chemistry by Morrison and Boyd, 5th/6th Ed., Prentice Hall.
2. Organic Chemistry by Solomons and Fryhle, Wiley Publishing
3. Guide to Organic Reaction Mechanism by Peter Sykes

4. Concise Inorganic Chemistry by J. D. Lee, 4th/5th Ed. ELBS
5. Inorganic Chemistry by D. F. Shriver, P. W. Atkins, C. H. Langaford ,Oxford, 1990
6. A Text Book on Engineering Chemistry by B. Pani, Galgotia Publication.
7. Engineering Chemistry by P. C. Jain and M. Jain.
8. Engineering Chemistry by R. Gopalan, D. Venkapaya and S. Nagarajan, Vikas Publishing House.

BSCC 2202 MATERIAL SCIENCES (3-0-0)

MODULE - I (10 Lectures)

1. Classification of Engineering Materials. Engineering properties of materials. Selection of Materials.
2. Electron theory of solids : Free electron theory of metals. Electrical conductivity; Thermal conductivity, Quantum theory of free electrons. Band theory of solids, Conductivity of metals
3. Conductors, Insulators, Semiconductors, Intrinsic and extrinsic semiconductors, Band theory of semi conductors Hall effect.
4. Super Conductors - Zero resistivity, Critical magnetic field and critical current density. Type I and II super conductors. Applications of Supercoductors.

MODULE - II (10 Lectures)

5. Dielectric Materials : Microscopic Displacement of atoms and molecules in an external dc electric field, Polarization and dielectric constant, Dielectric susceptibiity. Temperature dependence, Dielectric Breakdown. Ferro electric material Piezoelectrics, Pyroelectrics, Dielectric Materials as electrical isulators.
6. Magentic Properties of Materials : Dia, Para and Ferro magenetic materials. Theory of magnetism, Ferro magnetic materials or Ferrites, Comparison of magnetic behaviour and magnetic parameters of Dia, Para and Ferro magnetic materials.
7. Optical Properties of Materials : Scattering, Refraction, Theory of Refraction and absorption, Atomic Theory of optical properties. Lasers, Optical fibres - Principle, structure, application of optical fibre.

MODULE - III (10 Lectures)

8. Organic Materials : Polymers - Mechanism of Polymerization : Addition, condensation and co-polymerisation, applications.

   Plastics - Types : Thermosetting and thermoplastics. Transfer moulding, injection moulding, extension moulding, Blow moulding, Welding of plastics; Rubber types, application.
9. Ceramics : Types, Structure, Mechanical properties, applications

MODULE - IV (10 Lectures)

10. Composite Materials : Agglomerated Materials : Cermets, Reinforced Materials : Reinforced Concrete. Glass fibre reinforced plastics, Carbon fibre reinforced plastics. Whiskers, fibre reinforced plastics, Laminated plastic sheets. Tufnol, Properties of composites. Metal matrix composites, manufacturing procedure for fibre reinforced composites.
11. Performance of Materials in Service : Service performance, failure, design considerations, Corrosion - types, (Atmospheric, Pitting, Stress Corrosion), Control & prevention, protective coating, Performance of metals and Ceramics at high temperature.

Text Books :

1. Callister W.D., Materials Science and Engineering, John Wiley & Sons.
2. Vijaya M. S., Rangarajan G, Materials Science, TMH
3. Rajendra V., Marikani A., Materials Science, TMH
4. Van Vlack L. H., Elements of Material Science and Engineering, Addison Wesley
5. Material Science, Raghavan
6. Processes and Material of manufacture : Lindberg, PHI.

BCSE 3201 OBJECT ORIENTED PROGRAMMING USING C++ (3-0-0)

Module I (10 hours)

Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++ -syntax, data-type, variables, strings, functions, exceptions and statements, namespaces and exceptions, operators. Flow control, functions, recursion. Arrays and pointers, structures.

Module II (10 hours)

Abstraction mechanisms: Classes, private, public, constructors, member functions, static members, references etc. Class hierarchy, derived classes.

Inheritance: simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

Module III (12 hours)

Prototypes, linkages, operator overloading, ambiguity, friends, member operators, operator function, I/O operators etc.

Memory management: new, delete, object copying, copy constructors, assignment operator, this input/output.

Exception handing: Exceptions and derived classes, function exception declarations, Unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

Module IV (8 hours)

Templates and Standard Template library: template classes, declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type.

Design using C++ design and development, design and programming, role of classes.

Text Books :

1. Bhave & Patekar- Object oriented Programming with C++, Pearson Education
2. Ashok N. Kamthane- Object oriented Programming with ANSI & Turbo C++, Pearson Education.
3. Robert Lafore- Object oriented programming in Microsoft C++.
4. Balguru Swamy-C++, TMH publication

HSSM 4201 ENGINEERING ECONOMICS AND COSTING(3-0-0)

Module I (10 hours)

Time value of money : Simple and compound interest, Time value equivalence, Compound interest factors, Cash flow diagrams, Calculation, Calculation of time –value equivalences.

Present worth comparisons, Comparisons of assets with equal, unequal and infite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Module II (10 hours)

Use and situations for equivalent annual worth comparison, Comparison of assets of equal and unequal life. Rate of return, Internal rate of return, comparison of IIR with other methods, IRR misconceptions. Analysis of public Projects : Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost –effectiveness analysis.

Module III (10 hours)

Depreciation, Computing depreciation charges, after tax economic comparison, Break-even analysis; linear and non-linear models. Sensitivity analysis: single and multiple parameter sensitivity.

Module IV (12 hours)

Fixed and variable cost, Product and Process Costing, Standard Costing, Cost estimation, Relevant Cost for decision making, Cost estimation, Cost control and Cost reduction techniques.

Text Book :

1. Horn green, C.T., Cost Accounting, Prentice Hall of India
2. Riggs, J.L ., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition, 1996 (Chapter 2,3,4,5,7,8,9,11,12)

HSSM 4202 ORGANIZATIONAL BEHAVIOUR (3-0-0)

Module I (8 hours)

The Study of Organizational Behaviour : Learning objectives, Definition and Meaning, Why Study OB, An OB Model, New Challenges for OB Manager.

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Case Analysis

Module II (10 hours)

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB. Motivation – Nature and Importance, Hertzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Case Analysis

Module III (12 hours)

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness. Groups in Organizations - Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. Leadership – Leadership & Management, Theories of Leadership – Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Follwership, How to be an effective Leader. Conflict – Nature of Conflict and Conflict Resolution.

An Introduction to Transactional Analysis (TA).

Case Analysis

Module IV (10 hours)

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management – Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organizational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

Case Analysis

TEXTBOOKS:

Keith Davis, Organizational Behaviour, McGraw – Hill.

K.Aswathappa, Organizational Behaviour, Himalaya Publishing House.

REFERENCE BOOKS :

Stephen P. Robbins, Organizational Behaviour, Prentice Hall of India.

Pradip N. Khandwalla, Organizational Behaviour, McGraw – Hill, New Delhi.

CPES 5202 ANALOGUE ELECTRONICS CIRCUITS (3-1-0)

MODULE - I (11 hours)

1. DC biasing of BJTs and FETs : Load lines, Operating Point, Fixed bias and Voltage - divider bias. DC bias with voltage feedback. Bias stabilization. Design of bias.
2. Small Signal Modelling of BJT and Analysis : The r_e transister model, hybrid model, graphical determination of h-parameters. Low frequency small signal analysis of CE, CC and CB configurations without feedback.

MODULE - II (14 hours)

3. Small Signal Modelling and Analysis of FETs : Small Signal Model, Analysis of JFET C-S and C-D configuration. Analysis of E-MOSFET and D-MOSFET configurations.
4. System Approach - Effects of R_S and R_L : Two-port system, Individual and combined effects of R_S and R_L on CE, Emitter follower and C-S networks.
5. BJT and JFET Frequency Response : General frequency considerations. Low-frequency analysis of R-C combination in single stage BJT or FET amplifier - Bode Plot. Lower Curt Off frequency for the system. Low frequency response of BJT and FET amplifiers. Miller Effect Capacitance. High - frequency modelling of BJT and FET. High frequency analysis of BJT and FET amplifiers - Bode plot. Square Wave testing of amplifiers.

MODULE - III (14 hours)

6. Compound Configurations : Cascade, Cascode and Darlington connections, C-MOS Circuit, Current Source Circuits, Differential amplifier circuit.
7. Feedback and Oscillator Circuit : Feedback and Oscillator Circuit : Feedback concept, Type of feedback circuits, Practical feedback circuit. Analysis of only voltage-series feedback type amplifier. Effects of negative feedback. Positive feedback, Barkhausen Criterion of Oscillation. Oscillator Operation. R-C phase shift oscillator. Crystal Oscillator.
8. Ideal Operational Amplifiers : Differential and Common mode operation, OP-AMP basics. Equivalent Circuit Analysis of Inverting and Non - inverting OP - AMP circuits. Input impedence.

MODULE - IV (8 hours)

9. Practical OP-AMPS : OP-AMP Specifications, DC offset parameters, frequency parameters, gain - bandwidth. OP-AMP applications on constant gain multiplier, Voltage summing,

Inegrator, Differentiator and Controlled sources. Instrumentation Amplifier and Active Filters- low, high and bandpass.

10. Power Amplifiers : Definition of A, B and C types. Conversion efficiency, Distortion analysis. Push - pull configuration.

TEXT BOOK :

1. Electronic Devices and Circuit Theory By - Robert L. Boylestad and Lowis Nashelsky.

   8th Edition Pearson Publication.

   Selected portion from Chapter 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 17.

SUPPLEMENTARY BOOKS :

2. Electronic Design - By Martin S. Roden etl. Fourth Edition, SPD Publication.
3. Integrated Electronics - By Millman & Halkias, Mcgraw Hill Internation students Edition.
4. Electronic Devices and Circuits By David A. Bell, 4th Edition, PHI.

PRACTICALS

BENG 9202 BASIC ELECTRONICS LAB. (0-0-3)

(At least 8 experiments including 1 - 7 and any one from 8 - 10)

1. Familiarity with electronics components and Devices

   Testing of a semiconductor Diode and a Transisitor. IC pins connection (Digital Multimeter should be used should be used in testing components and devices).

2. Study and use of Oscilloscope to view waveforms and measure its amplitude and frequency.
3. V - I Characterstic of a semiconductor diode. Determining DC and AC resistance.
4. Half wave and Full wave rectifiers without and with capacitor filter. Record of waveforms, Measurement of Average and rms values.
5. V - I Characterstics of anpn or pnp transistor. DC Biasing and measurement of dc voltages and currents.
6. Gain - frequency response of JFET common source R-C coupled amplifier/BJT CE RC coupled Amplifier.
7. Op amp in Inverting, non inverting, Integrating and Differentiating configuration, Record of wave forms.
8. Truth Tables of logic gates.
9. Study and experiment using MUX - DEMUX ICs / Shift Register IC.
10. Study on CMOS logic Inverter.

BENG 9201 BASIC ELECTRICAL ENGINEERING LAB. (0-0-3)

List of Experiment (Any 8 of the following)

1. Study and measurement the armature and field resistance of a DC machine.
2. Calibration of ammeter, voltmeter and wattmeter with the help of sub-standard instrument.
3. Verification of circuit theorems. Thevenin's and Superposition theorems (with DC source only).
4. Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.

5. Measurement of current, voltages and power in R-L-C series circuit excited by Single Phase AC supply.
6. Connection and starting of a three phase induction motor using direct online (DOL). or star-delta starter.
7. Connection and measurement of power consumption of a fluorescent lamp.
8. Determination of open circuit characteristics (OCC) of DC machine.
9. Starting and speed control of a DC shunt motor.
10. Connection and testing of a single phase energy meter (unity power factor load only)
11. Study of fan motor

BCSE 9201 COMPUTER (OOP) WITH C++ LAB. (0-0-3)

(10 classes for 10 different programs)

1. Programs on concept of classes and objects.(1 class)
2. Programs using inheritance.(1 class)
3. Programs using polymorphism.(1 class)
4. Programs on use of operator overloading.(1 class)
5. Programs on use of memory management.(1 class)
6. Programs on exception handling and use of templates.(1 class)
7. Programs on File handling in C++.(1 class)
8. Design problem on stock and accounting of a small organization, railway reservation, payroll preparation and optimization problem.(3 classes)

BENG 9203 MECHANICAL ENGINEERING LAB. (0-0-3)

Group A (Mechanics / Material Testing Lab.

1. Determination of equilibrium of coplanar forces.
2. Determination of Moment of Intertia of Flywheel
3. Determination of tensile strength of materials by Universal Testing Machine.

Group B

4. Determination of Metacentric Height and application to stability of floating bodies.
5. Verification of Bernoulli's Theorem and its application to Venturimeter.
6. Determination of Cd and Cd of Orifices.

Group C

7. Calibration of Bourden Type Pressure gauj and measurement pressure using manometers.
8. Study of Cut-Sections of 2 stroke and 4 stroke Diesel Engine.
9. Study of Cut-Sections of 2 stroke and 4 stroke Petrol Engine.

CPES 9201 NETWORK DEVICES LAB. (0-0-3)

1. Verification of Network Theorems
2. Study of D.C. and A.C. transients RL, RC, and RLC circuits.

3. Determination of parameters of a 2 port network Z, Y, h and ABCD parameters.
4. Determination of frequency response, attenuation and phase characterstics of the following networks : Low Pass, High Pass, Band Pass and Band Elimination filters.
5. Study of a transformer as a coupled circuit and determination of its self and mutual inductance.
6. Response of single of double tuned coupled circuits.
7. Spectral analysis of a non - sinusoidal wave form.

CPES 9202 ANALOG ELECTRONICS CIRCUIT LAB. (0-0-3)

List of Experiments

(At least 10 out of 12 experiments should be done)

1. BJT Bias circuit –Design, construction & test
2. JEET Bias circuits – Design, construction and test.
3. Design, Build and test of BJT common-emitter circuit –D.C and A.C performance, A.C voltage gain, input impedance and output impedance with bypassed and unbypassed emitter resistor.
4. Design, Build and test of BJT emitter-follower-D.C and A.C performance voltage gain, input impedance and output impadance investigated.
5. Design, Build and Test of JFET common- source and common-drain amplifiers : D.C and A.C performance, Voltage gain, input impedance and output unpedance investigated.
6. Frequency response of a common –emitter amplifier: low frequency, high frequency and mid frequency response.
7. feed back amplifiers : series and shunt feedback types- input and output impedance and A.C gain with and without feedback.
8. Differential amplifiers circuits: D.C bias and A.C operation without and with current source.
9. OP- Amp Schmitt Trigger Circuits.
10. OP-Amp Frequency Response and Compensation.
11. Square wave Testing of an amplifier.
12. R.C phase shift oscillator / Wien-Bridge Osc-using OP-Amp/ Crystal Osc.
13. Class A and Class B Power Amplifier.

4th Semester

BSCM 2202 MATHEMATICS - IV (3-1-0)

Module - I

Solution of equations by iteration, Newton's method, Secant method, Interpolation
Numerical integration and differntiation

Module - II

Gauss Siedel iteration method for solving a system of linear equations, Ruage Kutta Methods, Introductory Linear Programming, Introductory Programming

Module - III

Probability, Random variables, Probability distribution, mean & variance of distribution
Binomial, Poisson, hyper-geometric and normal distributions

Module - IV

Random sampling, estimation of parameters, confidence intervals, Testing of hypothesis, acceptance sampling, correlation and regression

Course covered by : Advance Mathematics by E. Kreyszig (8th Edition)

Chapter 17 (17.1 - 17.3, 17.5), Chapter 18 (18.4), Chapter 19 (19.1), Chapter 20, Chapter 21, Chapter 22

BENG 1201 ELECTRICAL MACHINES (3-1-0)

Module I (10 Lectures)

D.C Mechanics :

D.C Generator – construction and principle of operation, E.M.F. equation ; types of generator; no load and load characteristics; Voltage build-up of shunt

Generator; voltage regulation, Application.

D.C Motor –construction and principle of operation ; back E.M.F; torque and speed equations; characteristics and performance curves; speed control of series and shunt motors; motor starters; industrial application.

Losses and Efficiency of D.C machines.

Module II (10 Lectures)

Transformer:

Single phase – construction and principle of operation; E.M.F. equation; Phasor diagram; actual and approximate equivalent circuits; open and short circuit tests, voltage regulation; losses and efficiency.

Three Phase – Construction and principle of operation; connection of three single –phase units in wye, delta, open delta configurations; Autotransformer; conventional transformer connected as Autotransformer. Special Transformers – induction heating and high impedance and high frequency transformer.

Module III (10 Lectures)

Synchronous Machines :

Three- phase alternators – construction and principle of operation; E.M.F. equation; distribution and pitch factors; Synchronous reactance; performance of alternators on no-load and load; Phasor diagram; voltage regulation, power calculations of turbine and hydro-generators,; synchronization of a generator.

Three-Phase Synchronous Motor- construction and principle operation; V- curves; Phasor diagram; methods of starting; applications.

Module IV (10 Lectures)

Three-Phase induction Motor- construction of slip ring and squirrel cage type induction motors; Phasor diagram and equivalent circuit; torque-slip characteristics; maximum torque calculations; open and short-circuit tests; losses and efficiency; starting of induction motors; speed control; Induction generator.

Single-Phase Induction Motor- construction and principle of operation; capacitor- start and capacitor-run motors; Universal motor; Stepper motors.

Books :

1. Electrical Machines, Drives and Power Systems, 5th edition by Theodore Wildi (Pearson) : Text.
2. Electrical Machinery by A.E. Fitzerald and Charles Kingsley, Jr., and S.D. Umans, Tata McGraw Hill Publication.

3. Principles of Electric Machines by V.K Meheta and R. Meheta , S. Chand Publication.

CPES 5201 NETWORK THEORY (3-1-0)

MODULE - I (12 hours)

Topological description of networks; Reviews of mesh & nodal analysis. Reciprocity & Millman's theorem, Maximum power transfer theorem.

Q factor, Bandwidth and Selectivity in Series & parallel resonance Circuits.

Coupled Circuits : Dot Convention for representing coupled circuits, coefficient of coupling.

Loop Analysis of coupled circuits, single and double tuned coupled circuits Transiet study in RLC networks by Laplace transform method with DC and AC excitation.

Response to step, impulse and ramp inputs S - domain circuits

Two Port networks : Z, Y, h, & ABCD representation of T and TT2 - port networks both in transmission parameters T - TT networks, 2 port network, Cascade and Parallel Connections.

Image and iterative impendances.

MODULE - II (12 hours)

Network Functions & Responses :

Concept of complex frequency, driving point and transfer functions for one port and two network, poles & zeros of network functions, Restriction on Pole and Zero locations of network function. Impulse response and complete response. Time domain behaviour form pole-zero plot.

Filters : Design of low pass, high pass, band pass & band elimination filters. Active filters. Input Power, Power Transfer and Insertion loss.

Problems in Optimizing power transfer; Insertion loss.

MODULE - III (10 hours)

Fourier Series & Fourier Transforms : Fourier Series representation of non sinusoidal waves. Discrete spectra, rms values of non sinusoidal waves, Steady state response of linear circuits to non sinusoidal waves, power in such circuits. Fourier Internal and Fourier transform of signum and step functions. Applications to RL and RC circuits.

Network Synthesis :

Driving point functions, properties of positive real function.

MODULE - IV (8 hours)

Foster's reactance Theorem, Synthesis of LC, RC and RL networks by Cauer - I, Cauer - II, Foster - I, & II forms. Synthesis of active filters - Butterworth and Chebyshev Techniques.

TEXT BOOKS :

1. Network Analysis : M.E Van Valkenbrg
2. Network Analysis & Synthesis : Franklin F. Kua Second Edition

REFERENCE BOOKS :

1. A Course in Electrical Circuits and Analysis : M. L. Soni, J. C. Gupta
2. Network Synthesis : M. E. Van Valkenberg
3. Eloectrical Networks : Alexander & Sadiku

BENG 1208 - FLUID MECHANICS AND HYDRAULIC MACHINE (3-1-0)

Module – I (12 hours)

Introduction : Scope of fluid mechanics and its development as a science

Physical property of Fluid

Density, specific gravity, specific weight, specific volume, surface tension and capillarity, viscosity, compressibility and bulk modulus, Fluid classification.

Fluid static

Pressure, Pascal's Law, Pressure variation for incompressible fluid, atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure, monometer.

Hydrostatic process on submerged surface, force on a horizontal submerged plane surface, force on a vertical submerged plane surface.

Module – II (12 hours)

Buoyancy and flotation, Archimedes' principle, stability of immersed and floting bodies, determination of metacentric height.

Fluid kinematics : Introduction, description of fluid flow, classification of fluid flow. Acceleration of fluid particles, flow rate and continuity equation, differential equation of continuity.

Fluid dynamics : Introduction, Euler's equation along a streamline, energy equation, Bernoulli's equation, Analysis of finite control volumes and its application to siphon, venture meter, orifice meter

Module – III (6 hours)

Turbine : Classification, reaction, Impulse, outward flow, inward flow and mixed flow turbines, Francis & Kaplan turbines, Pelton wheel, Physical description and principle of operation, Governing of Turbine.

Module – IV (8 hours)

Centrifugal Pump : Principles of classification, Blade angles, Velocity triangle, efficiency, specific speed, characteristics curve.

Reciprocating Pump : Principles of working, slip, work done, effect of acceleration and frictional resistance, separation

Text Books :

1. Fluid Mechanics, A.K. Mohanty, PHI
2. Introduction to Fluid Mechanics and Fluid Machines, S.K. Som and G. Biswas, TMH
3. Fluid Mechanics, Modi & Seth

BSCC 2201 CHEMISTRY - II (3-0-0)

Module I (12 Lectures)

(To develop awareness about Water Treatment)'

Water quality parameters and standards.

Hardness of Water : Types of hardness, Units of hardness, Determination of hardness. Disadvantages of hardwater, acidity and alkalinity, Water Softening Techniques. Boiler feed water, Water for Domestic purposes (municipal / Drinking Water)

Module II (10 Lectures)

(To develop the basic concepts about the transition metal compounds and corrosion)

1. Corrosion:

   Dry and wet corrosion, Galvanic Corrosion, Stress Corrotion, Factors affecting corrosion, Corrosion Control : (Proper design and fabrication procedure, Cathodic protection, Passivation).

   (8 Lectures)

2. Polymers:

   Nomenclature and classification, Thermoplastic and thermosetting resins, Some typical useful polymers:Polyethylene,PVC, polystyrene, PMMA, Nylon 6:6, Nylon 6, Bakelite, Terylene,

Silicones. Natural and synthetic rubbers: Neoprene, Butyl and Polyuarethane rubber, Vulcanization.

(8 Lectures)

Module III (10 Lectures)

(To introduce the students about the basic concepts of fuels)

1. Fuels:

   Classification of fuels, calorific value, Analysis of Coal and Coke, Refining of Crude oil, Fractional distillation, Cracking, Knocking and antiknocking, Octane and Cetane number.

   Gaseous Fuel : Prodcer gas, Water gas, LPG & CNG.

   Cobustion Calculation.

Module IV (10 Lectures)

(To develop awareness amongst the students about the importance of water quality in domestic and industrial world and concepts of various kinds of pollutions)

1. Water Treatment:

   Water quality parameters and standards, treatment of water for industrial and domestic purpose.

2. Environment pollution:

   Green house effect, acid rain, depletion of ozone layer; Water pollution- bio chemical effect of lead, arsenic, mercury and fluorides, sewage-B.O.D. and C.O.D.

Books:

1. Organic Chemistry by Morrison and Boyd, 5th/6th Ed., Prentice Hall.
2. Organic Chemistry by Solomons and Fryhle, Wiley Publishing
3. Guide to Organic Reaction Mechanism by Peter Sykes
4. Concise Inorganic Chemistry by J. D. Lee, 4th/5th Ed. ELBS
5. Inorganic Chemistry by D. F. Shriver, P. W. Atkins, C. H. Langaford ,Oxford, 1990
6. A Text Book on Engineering Chemistry by B. Pani, Galgotia Publication.
7. Engineering Chemistry by P. C. Jain and M. Jain.
8. Engineering Chemistry by R. Gopalan, D. Venkapaya and S. Nagarajan, Vikas Publishing House.

BSCC 2202 MATERIAL SCIENCES (3-0-0)

MODULE - I (10 Lectures)

1. Classification of Engineering Materials. Engineering properties of materials. Selection of Materials.
2. Electron theory of solids : Free electron theory of metals. Electrical conductivity; Thermal conductivity, Quantum theory of free electrons. Band theory of solids, Conductivity of metals
3. Conductors, Insulators, Semiconductors, Intrinsic and extrinsic semiconductors, Band theory of semi conductors Hall effect.
4. Super Conductors - Zero resistivity, Critical magnetic field and critical current density. Type I and II super conductors. Applications of Supercoductors.

MODULE - II (10 Lectures)

5. Dielectric Materials : Microscopic Displacement of atoms and molecules in an external dc electric field, Polarization and dielectric constant, Dielectric susceptibiity. Temperature dependence, Dielectric Breakdown. Ferro electric material Piezoelectrics, Pyroelectrics, Dielectric Materials as electrical isulators.
6. Magentic Properties of Materials : Dia, Para and Ferro magenetic materials. Theory of magnetism, Ferro magnetic materials or Ferrites, Comparison of magnetic behaviour and magnetic parameters of Dia, Para and Ferro magnetic materials.
7. Optical Properties of Materials : Scattering, Refraction, Theory of Refraction and absorption, Atomic Theory of optical properties. Lasers, Optical fibres - Principle, structure, application of optical fibre.

MODULE - III (10 Lectures)

8. Organic Materials : Polymers - Mechanism of Polymerization : Addition, condensation and co-polymerisation, applications.

   Plastics - Types : Thermosetting and thermoplastics. Transfer moulding, injection moulding, extension moulding, Blow moulding, Welding of plastics; Rubber types, application.
9. Ceramics : Types, Structure, Mechanical properties, applications

MODULE - IV (10 Lectures)

10. Composite Materials : Agglomerated Materials : Cermets, Reinforced Materials : Reinforced Concrete. Glass fibre reinforced plastics, Carbon fibre reinforced plastics. Whiskers, fibre reinforced plastics, Laminated plastic sheets. Tufnol, Properties of composites. Metal matrix composites, manufacturing procedure for fibre reinforced composites.
11. Performance of Materials in Service : Service performance, failure, design considerations, Corrosion - types, (Atmospheric, Pitting, Stress Corrosion), Control & prevention, protective coating, Performance of metals and Ceramics at high temperature.

Text Books :

1. Callister W.D., Materials Science and Engineering, John Wiley & Sons.
2. Vijaya M. S., Rangarajan G, Materials Science, TMH
3. Rajendra V., Marikani A., Materials Science, TMH
4. Van Vlack L. H., Elements of Material Science and Engineering, Addison Wesley
5. Material Science, Raghavan
6. Processes and Material of manufacture : Lindberg, PHI.

MODULE - IV (7 Lectures)

9. Composite Materials : Agglomerated Materials : Cermets, Reinforced Materials : Reinforced Concrete. Glass fibre reinforced plastics, Carbon fibre reinforced plastics. Whiskers, fibre reinforced plastics, Laminated plastic sheets. Tufnol, Properties of composites.
10. Ceramics : Types, Structure, Mechanical properties, applications
11. Performance of Materials in Service : Service performance, failure, design considerations, Corrosion - types, (Atmospheric, Pitting, Stress Corrosion), Control & prevention, protective coating, Performance of metals and Ceramics at high temperature.

Text Books :

1. Callister W.D., Materials Science and Engineering, John Wiley & Sons.
2. Vijaya M. S., Rangarajan G, Materials Science, TMH

3. Rajendra V., Marikani A., Materials Science, TMH
4. Van Vlack L. H., Elements of Material Science and Engineering, Addison Wesley

BSCP 2201 PHYSICS - II (3-0-0)

This one semester Physics course is divided into four units. The unit - I deals with some aspects of nuclear physics, unit - II introduces certain features of condensed matter physics, unit - III deals with certain aspects of semiconductors and superconductors and unit - IV introduces Opto-electronic devices and fibre-optic communication system.

Unit - 1

This unit covers the basic principles and applications of different types of accelerators and their important applications.

Detailed constructional features of accelerators are not necessary.

1. Need for nuclear accelerators.
2. D.C. Accelerators : Cockcroft - Walton, Van de Graff, Tandem accelerators.
3. RF accelerators : Linear accelerator, cyclotron, electron accelerator, betatron.
4. Application of nuclear accelerators - production of radioisotopes, radiation processing of materials, medical applications.

Unit - 2

This Unit deals with diffraction in crystals and its role in determining crystal structure.

Study of crystal structure by diffraction methods, Bragg's condition for crystal diffraction, Lau condition, Miller indices, Reciprocal lattice, Geometrical structure factor, Atomic form factor.

Unit - 3

This unit deals with certain features of semiconductors and superconductors.

1. Energy bands in solids: Kronig - Penny model, allowed bands and forbidden gaps, elemental and compound semiconductors.
2. Superconductivity : Superconductors and their properties, Meisner effect, Type - I and Type - II Superconductors, Thermodynamic properties of superconductors, London equation, Application of superconductors.

Unit - 4

This unit introduces some Opto - electronic devices and fibre - optic communication system.

Laser : Principle of lasing, properties of Laser, construction and working of semiconductor laser, Application of laser.

LED : Principle construction of operation and application, Introduction to fibre optics, basic characterstics of optical fibres, optical fibre communication system.

Books Recommended :

1. Nuclear Physics, P. R. Roy & B. P. Nigan
2. Particle Accelerators, M. S. Livingston & J. P. Blewett
3. Concepts of Modern Physics, A. Beiser
4. Introduction to Solid State Physics, C. Kittel
5. Introduction to Lasers, A. Avadhnulu
6. Physics - II, B. B. Swain and P. K. Jena.

BSCP 2202 PHYSICS OF SEMICONDUCTOR DEVICES (3-0-0)

Module I (9 hours)

An appreciation of Quantum Mechanics in determining electrical properties of semiconductor.

The Semiconductor in Equilibrium :

Equilibrium distribution of electrons & holes, the n0 and p0 equation, intrinsic carrier concentration; Do pant atoms and energy levels, ionization energy; the extrinsic semiconductor, the n0 p0 product, position of Fermi-energy level, variation of EF with doping concentration and temperature.

Carrier Transport Phenomena :

Carrier drift: mobility, conductivity, velocity saturation:

Carrier Diffusion: Diffusion current density. Total current density. The Einstein relation.

Module II (9 hours)

Non-equilibrium Excess Carrier in Semiconductor

Excess carrier generation and recombination, characteristics of excess carriers-continuity equation and time – dependent Diffusion equation. Ambipolar Transport – Derivation of equation and applications.

The Pn junction and Diode

Basic structure, built-in potential barrier, Electric field, space charge width; Reverse applied bias-space charge width and Electric field. Junction capacitances.

Pn junction Diode : Ideal – current voltage relationship, Minority Carrier distribution, Ideal Pn junction currents under forward and reverse bias.

Module III (9 hours)

Pn junction diode (contd.):

Temperature effects, Small signal model of Pn junction, Equivalent circuits Recombination Current. Junction Breakdown.

Metal-Oxide- Semiconductor FET (MOSFET)

The MOS structure : Energy band diagrams, Depletion Layer thickness, Work function difference, Flat band Voltage, Threshold Voltage, Charge distribution, Capacitance –Voltage characteristics.

The basic MOSFET operation, Current –Voltage relation (Concepts)

Frequency limitation : Small signal Equivalent circuit.

The CMOS Technology.

Module IV (8 hours)

The Bipolar Transistor

Basic Principle of Operation., Simplified Transistor Current Relation. Modes of operation, Amplification with Bipolar transistors, Minority Carrier distribution Forward active mode, other modes of operation. Low Frequency Common Base Current gain,. Non-ideal effects –Base width Modulation, Breakdown Voltage. Equivalent Circuit Models –Eber's –Moll Model, Hybrid- Pi model. Frequency limitation. Large Signal Switching characteristics.

Text Book :

1. Semiconductor Physics and Devices- Basic Principles BY Donald A. Neamen, 3rd Edition, Tata McgrawHill Edition. (Selected portion from chapters 2,4,4,6,7,8,10 &11.)

For additional reading :

2. Solid state Electronics Devices – y Ben G. Strectman and Sanjay Benerjee, 5th Edition, Pearson Edu.

BCSE 3202 RELATIONAL DATABASE MANAGEMENT SYSTEMS (3-0-0)

Module I (10 hours)

Database System Architecture - Data Abstraction, Data Independence, Data Definitions and Data Manipulation Languages.
Data models - Entity Relationship(ER), Mapping ER Model to Relational Model, Network .Relational and Object Oriented Data Models, Integrity Constraints and Data Manipulation Operations.

Module II (10 hours)

Relation Query Languages, Relational Algebra, Tuple and Domain Relational Calculus, SQL and QBE. Relational Database Design: Domain and Data dependency, Armstrong's Axioms, Normal Forms, Dependency Preservation, Lossless design, Comparison of Oracle & DB2

Module III (8 hours)

Query Processing and Optimization: Evaluation of Relational Algebra Expressions, Query Equivalence, Join strategies, Query Optimization Algorithms.

Module IV (12 hours)

Storage Strategies: Indices, B-Trees, Hashing, Transaction processing: Recovery and Concurrency Control, Locking and Timestamp based Schedulers, Multiversion and Optimistic Concurrency Control Schemes.
Advanced topics: Object-Oriented and Object Relational databases. Logical Databases, Web Databases, Distributed Databases, Data Warehouse and Data Mining.

Text Books:-

1. Elmaski & Navathe -Fundamentals of Database Systems, 4th Edition, Pearson Education
2. C.J.Date - An introduction to Database Systems, Pearson Education
3. Bipin Desai -An introduction to Database System, Galgotia Publication.

HSSM 4202 ORGANIZATIONAL BEHAVIOUR (3-0-0)

Module I (8 hours)

The Study of Organizational Behaviour : Learning objectives, Definition and Meaning, Why Study OB, An OB Model, New Challenges for OB Manager.

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Case Analysis

Module II (10 hours)

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB. Motivation – Nature and Importance, Hertzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Case Analysis

Module III (12 hours)

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness. Groups in Organizations - Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. Leadership – Leadership & Management, Theories of Leadership – Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Follwership, How to be an effective Leader. Conflict – Nature of Conflict and Conflict Resolution.

An Introduction to Transactional Analysis (TA).

Case Analysis

Module IV (10 hours)

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management – Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organizational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

Case Analysis

TEXTBOOKS :

Keith Davis, Organizational Behaviour, McGraw – Hill.

K.Aswathappa, Organizational Behaviour, Himalaya Publishing House.

REFERENCE BOOKS :

Stephen P. Robbins, Organizational Behaviour, Prentice Hall of India.
Pradip N. Khandwalla, Organizational Behaviour, McGraw – Hill, New Delhi.

HSSM 4201 ENGINEERING ECONOMICS AND COSTING (3-0-0)

Module I (10 hours)

Time value of money : Simple and compound interest, Time value equivalence, Compound interest factors, Cash flow diagrams, Calculation, Calculation of time –value equivalences.

Present worth comparisons, Comparisons of assets with equal, unequal and infite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Module II (10 hours)

Use and situations for equivalent annual worth comparison, Comparison of assets of equal and unequal life. Rate of return, Internal rate of return, comparison of IIR with other methods, IRR misconceptions. Analysis of public Projects : Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost –effectiveness analysis.

Module III (10 hours)

Depreciation, Computing depreciation charges, after tax economic comparison, Break-even analysis; linear and non-linear models. Sensitivity analysis: single and multiple parameter sensitivity.

Module IV (12 Hours)

Fixed and variable cost, Product and Process Costing, Standard Costing, Cost estimation, Relevant Cost for decision making, Cost estimation, Cost control and Cost reduction techniques.

Text Book

1. Horn green, C.T., Cost Accounting, Prentice Hall of India
2. Riggs, J.L ., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition, 1996 (Chapter 2,3,4,5,7,8,9,11,12)

CPES 5203 DIGITAL ELECTRONICS CIRCUITS (3-1-0)

Module I (11 Hours)

Number System and Codes

Binary Number base Conversations, Octal and Hexadecimal numbers, Complements, Signed Binary Numbers, Binary Codes- BCD Codes, Gray Code, ASCII Character Code, Codes for serial data transmission and storage. **Boolean Algebra and Logic Gates**

Axiomatic definition of Boolean algebra. Basic theorems and properties of Boolean algebra, Boolean functions; Canonical and Standard forms; minterms and maxterms standard forms; minterms and maxterms, standard forms Digital Logic Gates, multiple inputs.

Module II (13 hours)

Gate Level Minimization

The Map Method, K Maps, input five variables, Product of Sums Simplification, Don't care conditions. Nand and NOR implementation. AND –OR invent, OR-AND invent implementation, Ex-OR function, Parity generation and checking, Hardware Description Language (HDL).

Combinational Logic

Combinational Circuits, Analysis and Design Procedure; Binary Adder-Sub tractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multipliers, HDL for Combinational Circuits.

Module III (12 hours)

Synchronous Sequential Logic

Sequential Circuit, Latches, Flip-flop, Analysis of Clocked sequential Circuits, HDL for Sequential Circuits, State Reduction and Assignment. Design Procedure.

Registers and Counters

Shift Register, Ripple Counters, Synchronous Counters Asynchronous Counter, Ring Counters, Modulo-N Counters, HDL for Registers and Counters.

Module IV (15 hours)

Memory and Programmable Logic

Random Access Memory (RAM), Memory Decoding, Error detection and Correction, Read only Memory, Programmable Array Logic, Sequential Programmable Devices.

Register Transfer Levels

Register transfer level notion, Register transfer level in HDL, Algorithm, State Machine, Design Examples. HDL Description of Design, Examples, Binary Multiplier, HDL, Description of Binary Multiplier.

Digital Integrated Logic Circuits

RTL, DTL, TTL, ECL, MOS and CMOS logic circuits. Switch –lever-Modeling with HDL.

Text Book :

1. Digital Design, 3rd Edition by M. Morries Mano, Pearson Edu. India, Additional Reading Ch. ! to 10 except 9.
2. Digital Design – Principle & Practice, 3rd Edition by John F. Wokerly, Pub. Pearson Education.

PRACTICALS

BENG 9201 BASIC ELECTRICAL ENGINEERING LAB. (0-0-3)

List of Experiment (Any 8 of the following)

1. Study and measurement the armature and field resistance of a DC machine.
2. Calibration of ammeter, voltmeter and wattmeter with the help of sub-standard instrument.
3. Verification of circuit theorems. Thevenin's and Superposition theorems (with DC source only).
4. Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.
5. Measurement of current, voltages and power in R-L-C series circuit excited by Single Phase AC supply.
6. Connection and starting of a three phase induction motor using direct online (DOL). or star-delta starter.
7. Connection and measurement of power consumption of a fluorescent lamp.
8. Determination of open circuit characteristics (OCC) of DC machine.
9. Starting and speed control of a DC shunt motor.
10. Connection and testing of a single phase energy meter (unity power factor load only)
11. Study of fan motor

BENG 9202 BASIC ELECTRONICS LAB. (0-0-3)

(At least 8 experiments including 1 - 7 and any one from 8 - 10)

1. Familiarity with electronics components and Devices

   Testing of a semiconductor Diode and a Transisitor. IC pins connection (Digital Multimeter should be used should be used in testing components and devices).
2. Study and use of Oscilloscope to view waveforms and measure its amplitude and frequency.
3. V - I Characterstic of a semiconductor diode. Determining DC and AC resistance.
4. Half wave and Full wave rectifiers without and with capacitor filter. Record of waveforms, Measurement of Average and rms values.
5. V - I Characterstics of anpn or pnp transistor. DC Biasing and measurement of dc voltages and currents.
6. Gain - frequency response of JFET common source R-C coupled amplifier/BJT CE RC coupled Amplifier.
7. Op amp in Inverting, non inverting, Integrating and Differentiating configuration, Record of wave forms.
8. Truth Tables of logic gates.
9. Study and experiment using MUX - DEMUX ICs / Shift Register IC.
10. Study on CMOS logic Inverter.

BCSE 9202 COMPUTER (RDBMS) LAB. (0-0-3)

(10 Classes for 10 Different Programs)

1. Use of SQL syntax : Insertion, Deletion, Join), Updation using SQL. (1 class)
2. Program segments in embedded SQL using C as host language to find average grade point of a student, etc.. (1 class)
3. Program for Log based data recovery technique. (1 class)
4. Program on data recovery using check point technique. (1 class)
5. Concurrency control problem using lock operations. (1 class)
6. Use of package (ORACLE) for programming approaches(2 classes)
7. Use of package (DB2) for programming approaches(2 classes)
8. Programs on JDBC/ODBC to print employee's / student's information of a particular department. (1 class)

CPES 9201 NETWORK DEVICES LAB. (0-0-3)

1. Verification of Network Theorems
2. Study of D.C. and A.C. transients RL, RC, and RLC circuits.
3. Determination of parameters of a 2 port network Z, Y, h and ABCD parameters.
4. Determination of frequency response, attenuation and phase characterstics of the following networks : Low Pass, High Pass, Band Pass and Band Elimination filters.
5. Study of a transformer as a coupled circuit and determination of its self and mutual inductance.
6. Response of single of double tuned coupled circuits.
7. Spectral analysis of a non - sinusoidal wave form.

BENG 9203 MECHANICAL ENGINEERING LAB. (0-0-3)

Group A (Mechanics / Material Testing Lab.

1. Determination of equilibrium of coplanar forces.
2. Determination of Moment of Intertia of Flywheel
3. Determination of tensile strength of materials by Universal Testing Machine.

Group B

4. Determination of Metacentric Height and application to stability of floating bodies.
5. Verification of Bernoulli's Theorem and its application to Venturimeter.
6. Determination of Cd and Cd of Orifices.

Group C

7. Calibration of Bourden Type Pressure gauj and measurement pressure using manometers.
8. Study of Cut-Sections of 2 stroke and 4 stroke Diesel Engine.
9. Study of Cut-Sections of 2 stroke and 4 stroke Petrol Engine.

CPES 9203 DIGITAL ELECTRONICS CIRCUITS LAB. (0-0-3)

(10 experiments out of 13 should be done during the Semester)

1. Digital Logic Gates : Investigate logic behaviour of AND, OR, NAND, NOR, EX-OR, EX-NOR. Invert and Buffer gates, use of Universal NAND Gate.
2. Gate–level minimization : Two level and multi level implementation of Boolean functions
3. Combinational Circuits: design construct and test : address and subtractors, code converters, gray code to binary and 7 segment display.

4. Design, implement and test a given design example with (i) NAND Gates only (ii) XOR Gates only and (iii) Decide and NAND Gates.
5. Design with multi-plexers and de-multiplexers.
6. Flip-Flap : construct, Test and investigate operation of SR, D & J-K flipflops.
7. Shift Registers : Investigate the operation of all types of shift registers with parallel load. Design.
8. Counters : Design, construct and test various ripple and synchronous counters – decimal counter, Binary counter with parallel load.
9. Memory Unit : Investigate the behaviour of RAM unit and its storage capacity – 16 X 4 RAM : testing, simulating and memory expansion.
10. Clock-pulse generator- design, implements and test.
11. Parallel adder and accumulator : design, implement and test.
12. Binary Multiplier : design and construct a circuit that multiplier 4-bit unsigned numbers to produce a 8-bit product.
13. Verilog HDL simulation of experiments : choose any form Sl No 3 to 12 and implement it.

COURSE STRUCTURE
THIRD YEAR B.TECH PROGRAMME
INFORMATION TECHNOLOGY

5th Semester				**6th Semester**			
Theory		*ContactHrs.*	*Credit*	*Theory*		*ContactHrs.*	*Credit*
		L-T-P				**L-T-P**	
HSSM 4301	Optimization in Engineering	3-0-0	3	HSSM 4302	Production & Operation Mgmt.	3-0-0	3
BCSE 3301	Design & Analysis of Algorithms	3-0-0	3	BCSE 3305	Operating Systems	3-0-0	3
BCSE 3302	Multimedia Technologies	3-0-0	3	BCSE 3306	Computer Networks	3-0-0	3
BCSE 3303	Computer Arch. & Organization	3-0-0	3	BCSE 3307	Computer Architecture & Organisation –II	3-1-0	4
BSCM3301	Discrete Mathematical Structures	3-1-0	4	CPEC 5302	Digital Signal Processing	3-1-0	4
BCSE 3304	Information Systems & Design	3-0-0	3		**Elective – I (*Any one*)**	3-0-0	3
				PECS 3301	Artificial Intelligence		
				CPEC 5308	Communication Engineering		
				PEBT 8301	Bioinformatics		
Total			**19**		**Total**		**20**
Practicals/Sessionals		*ContactHrs.*	*Credit*	*Practicals/Sessionals*		*ContactHrs.*	*Credit*
BCSE 9301	Optimization Lab.	0-0-3	2	BCSE 9304	Operating System Lab.	0-0-3	2
BCSE 9302	Algorithms Lab.	0-0-3	2	CPEC 9304	DSP Lab	0-0-3	2
BCSE 9303	Computer & Organization Lab.	0-0-3	2	BCSE 9305	Project	0-0-3	2
			6				**6**
Total			**25**	**Total**			**26**

L-Lecture **T-Tutorial** **P-Practical**

5th Semester

HSSM 4301 OPTIMIZATION IN ENGINEERING (3-0-0)

Course Objective : The course aims at acquainting the students to mathematical modeling of engineering design, operation and maintenance problems and their optimization algorithms.

Module – I (10 hours)

Formulation of engineering optimization problems : Decision variables, objective function and constraints. Example of typical design, operation and maintenance problems in engineering : Design of a water tank, design of a truss, design of a network (electrical, communication sewerage and water supply networks), product mix problem, transportation and assignment problems, shift scheduling of employees, design of reliable devices, design of reactors, shortest route problem, set covering problem, traveling salesman problems. Only physical problems and their mathematical models to be discussed.

Linear Programming Problem : Formulation, Graphical solution, Simplex method, Duality theory, Dual simplex method, Formulation and solution of engineering problems of planning and scheduling.

Module – II (10 hours)

Sensitivity Analysis, Transportation Problem, Assignment Problem, Network Models : Minimal Spanning Tree Problem, Maximal Flow Problem, Shortest Route Problem, Minimum Cost Flow Problem. Algorithms and applications to be covered.

Module – III (10 hours)

Integer Linear Programming Problem. Branch and Bound and Cutting Plane Methods. Zero-one Programming Problem, Knapsack Problem, Set covering Problem, Set Partitioning Problem, Traveling Salesman Problem. Deterministic Dynamic Programming Problems. Applications and algorithms to be discussed.

Module – IV (12 hours)

Queueing theory, Game theory, Simulation, Decission theory & Sequencing Problem

References :

1. H. A. Taha – Operations Research, Prentice Hall of India, 2004.
2. D. T. Phillips, A Ravindran and J.J. Solaberg, Principles of Operation Research, John Wiley and Sons
3. S. Kalavathi, Operations research, Vikash Publication.
4. B.E Gillett, Introduction to operations research, TMH

BCSE 3301 DESIGN & ANALYSIS OF ALGORITHMS (3-0-0)

Module – I

Introduction to design and analysis of algorithms, Growth of Functions (Asymptotic notations, standard notations and common functions), Recurrences, solution of recurrences by substitution, recursion tree and Master methods, worst case analysis of Merge sort, Quick sort and Binary search, Design & Analysis of Divide and conquer algorithms.

Heapsort :

Heaps, Building a heap, The heapsort algorithm, Priority Queue, Lower bounds for sorting.

Module – II

Dynamic programming algorithms (Matrix-chain multiplication, Elements of dynamic programming, Longest common subsequence)

Greedy Algorithms – (Achivity- selection Problem, Elements of Greedy strategy, Fractional knapsac problem, Huffman codes).

Module – III

Data structure for disjoint sets :- Disjoint set operations, Linked list representation, Disjoint set forests.

Graph Algorithms: Breadth first and depth-first search, Minimum Spanning Trees, Kruskal and Prim's algorithms, single – source shortest paths (Bellman-ford and dijkstra's algorithms).

Module – IV

Fast Fourier Transform, string matching (Rabin-Karp algorithm), NP – Completeness (Polynomial time, Polynomial time verification, NP – Completeness and reducibility, NP-Camplete problems (without Proofs), Approximation algorithms (Traveling Salesman Problem).

Text Book :

T.H. Cormen, C.E. Leiserson, R.L. Rivest,

C.Stein : Introduction to algorithms –2nd edition, PHI,2002.

Chapters : 1,2,3,4 (excluding 4.4), 6,7,(7.4.1), 8(8.1)15(15.2,15.3,15.4), 16 (16.1,16.2,16.3), 21 (21.1,21.2,21.3), 22(22.2,22.3), 23,24(24.1,24.2,24.3) 30,31(31.1,31.2) 34,35(35.2)

BCSE 3302 MULTIMEDIA TECHNOLOGY (3-0-0)

Module - I

Multimedia System Organization and Architecture, QOS architecture, Multimedia Distributed Processing Models, Multimedia Conferencing Model, Storage Organization.

Module – II

Psychoacoustics, Digital audio and computer, Digital representation of sound, Audio Signal Processing (editing and sampling), Audio Production, Digital Music, Musical Instrument Synthesizer, MIDI protocol.

Module - III

Raster Scanning Principal, Color fundamental, color video, video performance measurement, Analog audio, Stereo effect, MPEG and DVI technology, Multimedia applications Toolkit and hyper application.

Module – IV

Multimedia information system, Operating system support middleware system service architecture, Presentation services, User Interface, File system and information and information model, presentation and anchoring file.

Multimedia standards role of standards, Standardization issues, distributed multimedia systems.

Text Books :

Multimedia Systems, P.K. Buford, AWL

Multimedia Application Development, M. J. Bunzal and S.K. Morriec, Tata McGraw Hill

Multimedia Communication Systems, Rao, Bojkovic and Milovanovic

Multimedia Computing Communication and Application, Ralf & Klara

BCSE 3303 COMPUTER ARCHITECTURE AND ORGANIZATION (3-0-0)

Module –I

Basic structures of Computers: Functional units, operational concepts, Bus structures, Software, Performance, Multiprocessors and multicomputers. Machine Instruction and Programms: Memory location and addresses, Memory Operations, Instructions and instruction Sequencing, Addressing modes, Assembly Language, Basic Input/Output operations, subroutine, additional Instructions.

Module – II

8085 Microprocessor Architecture: Instruction Sets, Addressing modes, Memory Interfacing, Assembly Language Programming.

Module – III

Arithmetic : Addition and subtraction of signed Numbers, Design of Fast Adders, Multiplication of positive Numbers, Signed-operand multiplication , Fast multiplication, Integer Division, Floating- point Numbers, (IEEE754 s…) and operations.

Module – IV

Basic Processing units: Fundamental concepts, execution of complete Instructions, Multibus organization, Hardwired control, Micro programmed control

Memory System: Basic Concepts, cache Memory, performance consideration, Virtual memories, Memory Management requirement, secondary storage.

Text Book :

1. Computer Organization Carl Hamacher, Zvonkovranesic, Safwat Zaky, Mc Graw Hill.
2. Microprocessor Architecture, Programming and application with 8085, R.S. Gaonkar

Reference Book :

1. Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy ELSEVIER.
2. Computer Architecture and Organisations, Design principles and Application. B. Govinda Rajalu, Tata McGraw-Hill Publishing company Ltd.
3. Computer system Architecture: Morris M. Mano PHI New Delhi.
4. Computer Architecture and Organization. John P. Hayes McGraw Hill introduction.
5. Structured Computer Organisation A.S. Tanenbum, PHI

BSCM 3301 DISCRETE MATHEMATICAL STRUCTURES (3-1-0)

Module – I

Logic, Prepositional Equivalences, Predicates and quantifiers, Nested quantifiers, methods of proof, proof strategies, sequences and summations. Mathematical induction, recursive definition and structural induction, Program corrections.

Module – II

Basics of counting, the pigeonhole principle, generalized permutations and combinations, recurrence relations, solution of recurrence relations, generating functions, Inclusion - Exclusion, Applications of Inclusion-Exclusion, Relations and their properties, many relations representation & closures of relation, Equivalence relations, partial orderings.

Module – III

Introduction to graphs, graph terminology, representing graphs and graph isomorphism, connectivity, Erlong and Hamiltonian Paths, Planar graphs, graph coloring. Introduction to trees, Application of trees,

Module – IV

Semi groups, Monoids, Groups, Subgroups, Cosels and Lagrange's theorem, Permutation groups, group codes, Isomorphisms, Homomorphism and normal subgroups, Rings, Integral domains and fields.

Lattices and algebraic systems, principle of duality, Basic Proportion, Distributive & complemented lation boolean lattices and Boolean algebras, Boolean function and Boolean expression, proposional calculus.

Text Books :

1. K.E. Rosen : Discrete Mathematics and its application 5th Edition Tata McGraw Hill, 2003 Chapters: 1(1.1-1.5), 3(3.1-3.4,3.6), 4(4.1-4.3,4.5),6(6.1,6.2,6.4-6.6), 7,8(8.1-8.5, 8.7,8.8), 9(9.1,9.2)
2. C.L. Liu – Elements of Discrete Mathematics –2nd Edition TMH 2000. CHAPTERS: 11(11.1-11.10),12(12.1-12.8)
3. Thomas Koshy – Discrete Mathematics and Application, ELSEVIER.

BCSE 3304 INFORMATION SYSTEMS & DESIGN (3-0-0)

Module – I

Introduction to Information systems Development : overview of system analysis and Design Categories of Information systems, Systems Development strategies, Implementation and Evaluation, Tools for systems development, Information systems Planning Methodologies, Managing project Review and selection, Preliminary Investigation, Project Feasibility, selecting the project, development strategy.

Requirement Analysis and Determinations:

Activities in Requirements determination, Fact finding Techniques: Interview, Questionnaire, Record Review, observation, Tools for Documenting Procedures and Decisions: Decision Trees, Decision Tables, Structured Analysis, Dataflow Analysis, Tools for dataflow strategy, Developing data flow diagrams, Leveling, Data dictionary.

Module – II

Prototype Development Strategy: purpose of prototyping, steps in prototype Method, use of prototypes, tools for prototyping , Prototyping Strategies.

Computer Aided System Tools: Benefits of computer Assisted Tools, Categories of computer assisted system Engineering (CASE) Tools.

Module – III

System Design: Objectives, Features to be designed, Managing the design process, Managing End-User development system Design of output, Design of Input and control, Design of online dialogue, Design of Files and Databases.

Module – IV

System Engineering and Quality Assurance: Designing reliable and maintainable system , Program Structure charts, Software Modules, Coupling, Cohesion.

Software Design and documentation Tools :
Structured flowchart, HIPO, Wamier/Orr diagrams. Managing quality Assurance, Assessing system Reliability, Testing Strategies, Documentation.
Managing System Implementation: Training Conversion Methods, Data and File Preparation, post implementation review.
Managing Information system Development: Estimation and management of development Time, Personnel and Development Management, structured walkthroughs.

Selection of Hardware and Software:

Hardware Selection, Determining size and capacity requirements. Computer Evaluation, plug-compatible equipment, financial Factors, Maintenance and Support, Software Selection.

Text Book :
Analysis and Design of Information Systems, A. James Senn, Tata McGraw Hill

PRACTICALS
BCSE 9301 OPTIMIZATION LAB. (0-0-3)

1. Solving linear programming problems using a package (formulation, solution, sensitivity analysis etc)
2 writing small programmes to implement Hook and Jeeves algorithm, Nelder and Nead (Geometric Simplex Algorithm etc. in C, C ++ , Mat lab or any other programming language.
3. Solution of a simultaneous set of non-linear equations using minimization
4. Introduction to simulated annealing and genetic algorithm
5. Formulation of some real life engineering problems as optimization problems

BCSE 9302 DESIGN AND ANALYSIS OF ALGORITHM LAB. (0-0-3)

All the problems have to be implemented either writing C programs or writing C++ programs

Elementary Problems : (8 is compulsory and any four among the rest)

1. Using a stack of characters, convert an infix string to a postfix string.
2. implement polynomial addition using a single linked list
3. Implement insertion, deletion, searching of a BST, Also write a routine to draw the BST horizontally.
4. implement insertion routine in an AVL tree using rotation.
5. Implement binary search and linear search in a program
6. Implement heap sort using a max heap.
7. Implement DFS/ BFS routine in a connected graph
8. Implement Dijkstra's shortest path algorithm using BFS

Greedy Algorithm (Any Two)

1. Given a set of weights, form a Huffman tree from the weight and also find oot the code corresponding to each weight.

2. Take a weighted graph as an input, find out one MST using Kruskal/ prim's algorithm
3. Given a set of weight and an upper bound M – Find out a solution to the Knapsack problem

Divide and Conquer Algorithm (any Two)

1. Write a quick sort routine, run it for a different input sizes and calculate the time of running. Plot in graph paper input size verses time.
2. Implement two way merge sort and calculate the time of sorting
3. Implement Strasseem's matrix multiplication algorithm for matrices whose order is a power of two.

Dynamic programming (Any one)

1. Find out a solution for 0/1 knapsack problem
2. given two sequences of character, find out their longest common subsequence using dynamic programming

NP Complete and NP Hard problems (Any two)

1. Find out a solution to graph colorability problem of an input graph
2. Find out a solution to the N-Queen Problem
3. Find out a solution to sum of subset problems

Backtracking Algorithm (All two)

1. Rat in a Maze
2. Game Trees

BCSE 9303 COMPUTER & ORGANIZATION LAB. (0-0-3)

1. Simulation of fast multiplication and division algorithms in Matlab or C programs
2. Some experiments using hardware trainer kits for floppy drive, CD drive, dot matrix printers etc.
3. Dismantling and assembling a PC along with study of connectors, ports, chipsets, SMPS etc. Draw a block diagram of mother board and other board

A study project on some hardware technologies (Memory, Serial Bus, Parallel Bus, USB Standard, Hard Disk Technology etc)

6th Semester

HSSM 4302 PRODUCTION AND OPERATIONS MANAGEMENT (3-0-0)

Objective : This course aims at acquainting all engineering graduates irrespective of their specializations, the basic issues and tools of managing production and operation functions of an organization.

Module I

1. Operation Function in an Organization, Manufacturing Vrs Service Operation, System view of Operations, Strategic Role of Operations, Operations Strategies for Competitive Advantages, Operations Quality and Productivity Focus, Meeting Global Challenges of Production and Operations Imperatives.

   (3 hours)

2. Designing Products, Services and Processes New Product Design : Product Life Cycle, Product Development Process, Product Quality and Reliability Design, Process Technology : Project , Jobshop, Batch, Assembly Line, Continuous Manufacturing, Process Technology Life Cycle, Process Technology Trends; FMS, CIM, CAD, CAM, GT, Design for Services, Services Process Technology, Services Automation. Value Engineering, Standardization, Make or buy Decision.

   (4 hours)

3. Job Design and Work Measurement, Method Study : Techniques of Analysis, recording, improvement and standardization. Work Measurement : Work Measurement Principles using Stopwatch Time Study, Predetermined Motion Time Standards and Work Sampling, Standard Time Estimation.

   (4 hours)

Module II

4. Location and Layout Planning : Factor Influencing Plant and Warehouse Locations, Impact of Location on cost and revenues. Facility Location Procedure and Models : Qualitative Models, Breakeven Analysis, Single Facility, Location Model, Multi-facility Location Model, Mini max Location, Total and Partial Covering Model.

   Layout Planning : Layout Types : Process Layout, Product Layout, Fixed Position Layout Planning, Systematic Layout Planning, CRAFT.

   Group Technology and Cell Formation, Rank Order Clustering Method for Machine – Component Assignment,. Line Balancing : Basic concepts, General Procedure, Rank Positional Weight Method.

   (7 hours)

   Forecasting : Principles and Method, Moving Average, Double Moving Average, Exponential Smoothing, Double Exponential Smoothing, Winter's Method for Seasonal Demand, Forecasting Error Analysis.

   (4 hours).

Module III

6. Manufacturing Planning and Control : The Framework and Components : Aggregate Planning, Master Production Scheduling, Rough-cut-Capacity Planning, Material Requirements Planning, Capacity Requirements Planning, Shop Order System and Purchase Order System.

Transportation Method for Aggregate Production Planning, Material Requirement Planning, Scheduling and Dispatching Functions, Progress Monitoring and Control.

(4 hours)

7. Sequencing and Scheduling : Single Machine Sequencing : Basics and Performance Evaluation Criteria, Methods for Minimizing Mean Flow Time, Parallel Machines : Minimization of Makespan, Flowshop sequencing : 2 and 3 machine cases : Johnson's Rule and CDS heuristic. Jobshop Scheduling : Priority dispatching Rules.
8. Inventory Control : Relevant Costs, Basic EOQ Model, Model with Quantity discount, Economic Batch Quantity, Periodic and Continuous Review Systems for Stochastic Systems, Safety Stock, Reorder Point and Order Quantity Calculations. ABC Analysis.

(4 hours)

Module – IV

9. Project Management : Project Management through PERT / CPM. Network Construction, CPM, Network Calculation, Crashing of Project Network, Project Scheduling with Limited Resources. Line of Balance.

(5 hours)

10. Modern Trends in Manufacturing : Just in Time (JIT) System; Shop Floor Control By Kanbans, Total Quality Management, Total Productive Maintenance, ISO 9000, Quality Circle, Kaizen, Poke Yoke, Supply Chain Management

(6 hours)

Reference :

1. J. L. Riggs : Production Systems : Planning Analysis and Control, John Wiley.
2. E. E Adam and R. J. Ebert " Production and Operation Management", Prentice Hall of India, 2004.
3. S.N. Chary, " Production and Operations Management", Tata McGraw Hill.
4. R. Paneerselvam, "Production and Operation Management, Prentice Hall of India, 2005.

BCSE 3305 OPERATING SYSTEMS (3-0-0)

Module – I

Introduction : What is an Operating System.

Simple Batch Systems, Multiprogramming and Time Sharing systems. Personal Computer Systems, Parallel Systems, Distributed Systems and Real time Systems.

Operating system structures: system components, protection system, O.S. Services, system calls

Process Management: Process concept, Process Scheduling, Operation on Processes, Cooperting Processes. Interprocess communication. Threads CPU Scheduling : Basic concepts, scheduling criteria, scheduling algorithms.

Module – II

Deadlocks: System model, Deadlock Characterization Methods for Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, recovery from Deadlock.

Memory management: Background, Logical versus Physical Address space, swapping, contiguous Allocation. Paging, Segmentation.

Virtual Memory: Background, Demand paging, performance of Demand paging, Page Replacement, Page Replacement Algorithms. Allocation of frames, Thrashing, Demand Segmentation.

Module – III

File-system Interface: File concept, Access Methods Directory implementation, Recovery.

Module – IV

I/O systems: Overview, I/O Hardware, Application of I/O interface, Kernel I/O - subsystem Transforming I/O requests to Hardware Operations. Secondary storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap space Management, Disk Reliability, Case Studies LINUX, WINDOW NT.

Text Book :

Operating System Concepts : Abraham Silberschatz and Peter Bear Galvin, Addison wesley.

Chapter-1, Chapter-3 (3.1,3.2,3.3) , Chapter-4, Chapter-5(5.1,5.2,5.3) Chapter-7 (7.1-7.7), Chapter-8, Chapter-9, Chapter-10, Chapter-11, , Chapter-12(12.1-12.5), , Chapter-13(13.1-1.35)

Reference Book :

1. Operating System, McGraw Hill, Madnik & Donovan,
2. Operating Systems and system Programming, SCITECH, P. Blkeiahn Prasad.
3. Moswen O.S. – PHI, Andrew, S. Tannenbaum.

BCSE 3306 COMPUTER NETWORKS (3-0-0)

Module – I

Overview of Data Communications and Networking .

Physical Layer : Analog and Digital, Analog Signals, Digital Signals, Analog versus Digital, Data Rate Limits, Transmission Impairment, More about signals.

Digital Transmission : Line coding, Block coding, Sampling, Transmission mode.
Analog Transmission: Modulation of Digital Data; Telephone modems, modulation of Analog signals.
Multiplexing : FDM 150, WDM 155, TDM 157,

Transmission Media : Guided Media, Unguided media (wireless)
Circuit switching and Telephone Network : Circuit switching, Telephone network.

Module –II
Data Link Layer
Error Detection and correction : Types of Errors, Detection, Error Correction
Data Link Control and Protocols:

Flow and error Control, Stop-and-wait ARQ. Go-Back-N ARQ, Selective Repeat ARQ, HDLC.

Point-to –Point Access : PPP
Point –to- Point Protocol, PPP Stack,

Multiple Access
Random Access, Controlled Access, Channelization.
Local area Network : Ethernet.
Traditional Ethernet, Fast Ethernet, Gigabit Ethernet.
Wireless LANs: IEEE 802.11, Bluetooth virtual circuits: Frame Relay and ATM.

Module – III

Network Layer : Host to Host Delivery: Internetworking, addressing and Routing
Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6
Transport Layer : Process to Process Delivery : UDP; TCP congestion control and Quality of service.

Module –IV

Application Layer :
Client Server Model, Socket Interface, Domain Name System (DNS):
Electronic Mail (SMTP) and file transfer (FTP) HTTP and WWW.
Security

Cryptography, Message security, User Authentication.

Text Book :
1. Data Communications and Networking : Third Edition. Behrouz A. Forouzan
2. Tata McGraw-Hill Publishing company Limited.

Reference Book :
1. Computer Networks : Third Edition, A system Approach, Larry L/ Peterson and Bruce S. Davie ELSEVIER
2. Computer Networks, A. S. Tannenbum PHI

BCSE 3307 COMPUTER ARCHITECTURE & ORGANIZATION- II (3-1-0)

Module-1 (8 hours)
Input-output organization: Accessing I/O devices, Programmed I/O, Interrupt driven I/O, DMA, Buses, Interface circuits, standard I/O interfaces (PCI,SCSI,USB)

Module-2 (10hours)
Architectural classification of parallel processing (FLYNN'S), Pipelining: Basic concepts, Instruction and arithmetic pipelining, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data path and control considerations, superscalar operations, Ultra SPARC II example, performance considerations, pipeline reservation tables and scheduling.

Module-3 (10 hours)
Array processors: SIMD Array processors, SIMD Interconnection networks.
SIMD Computers and performance Enhancement: The space of SIMD Computers, The Illiac-IV and the BSP systems, The massively parallel processor, Performance Enhancement methods.

Module-4 (12 hours)

Multiprocessor: Functional structures, Interconnection networks, Parallel memory organizations, some example of multiprocessor: C.mmp, S-1, HEP, Mainframe multiprocessor systems, Cray X-mp.

Text Book :

1) Computer Organization by Carl Hamacher, Zvonko Vranesic, Safwat Zaky, INTERNATIONAL EDITION
2) Computer Architecture and parallel processing by Kai Hwang & Faye A. Briggs, McGraw Hill International Edition

CPEC 5302 DIGITAL SIGNAL PROCESSING (3-1-0)

Module – I

Signals, systems, and signal processing, classification of signals, Discrete –time signals: Elementary discrete time signals, classification, manipulations, of discrete time signals, discrete-Time, systems, Discrete –Time systems described by difference equations, Implementation of discrete-Time systems, correlation of Discrete-Time signals, Direct form –I and direct form –II, circular convolution , overlap save method and overlap add method.

Module – II

Discrete Fourier Transform

The Discrete Fourier Transform (DFT), The DFT as a linear Transformation, Relationship of the DFT to other Transforms, properties of DFT, IDFT, Fast Fourier Transform (FFT), Radix-2 FFT algorithms. Implementation of FFT algorithms circular convolution by DFT & IDFT method.

Module – III

FIR and IIA Filter design

Design of FIR filters using windows
Design of FIR filters by the Frequency sampling method.
Design of IIR filter by Impulse Invariance and by Bilinear Transformation method.
Difference between FIR & IIR filters.

Module – IV

Power Spectrum Estimation

Computation of the Energy Density Spectrum.
Estimation of the Autocorrelation and power spectrum of Random signals.
Use of the DFT in PSE
Parametric methods for PSE

(a) The yule-walker method for the AR model Parameters.
(b) The Burg method and LSM for the AR model.
(c) MA model for PSE
(d) ARMA model for PSE.

Text Books :

1. Digital Signal Processing by John G. Proakis, Dimitris G. Manolakis, PHI

   1.1,1.2,2.1-2.6,5.1,5.2,6.1.3,6.1.6, 8.2.2, 8.2.3, 8.3.2, 8.3.3,12.3.2-12.3.4, 12.3.7, 12.3.8

Reference :

1. Introduction to Digital Signal Processing, J.R. Johnson PHI

PECS 3301 ARTIFICIAL INTELLIGENCE (3-0-0)

Module –I

Formalized symbolic logic: Propositional logic- first order predicate logic, wff convervsion to clausal form, inference rules, the resolution principle, Dealing with inconsistencies and uncertainties, fuzzy logic.

Module – II

Probabilistic Reasoning Structured knowledge, graphs, frames & related structures, Knowledge organization and manipulation.

Module – III

Matching Techniques, Knowledge organizations, Management.

Module – IV

Natural Language processing, pattern recognition, expert systems.

Text Book :

Artificial intelligence, Dan W Patterson, Prentice Hall of India (1999) Chapter-4,5,7,9,10,11,12,13,15

Reference Books :

1. Artificial Intelligence, Nils J.Nilsson, ELSEVIER.

CPEC 5308 COMMUNICATION ENGINEERING (3-0-0)

Module – I

Amplitude Modulation Systems

Frequency translation
Amplitude modulation
The maximum allowable modulation
The square law demodulator
Spectrum of AM –signal
Modulators and Balanced modulators
DSB-SC, SSB, VSB

Module – II

Frequency Modulation Systems

Frequency modulated wave equation
Spectrum and deviation of FM- signal
Phasor diagram
NBFM & WBFM
FM Generation :- Parametric variation method and Armstrong system.

FM demodulators.

Module –III

Pulse Modulation System

Sampling Theorem, PAM, Natural and Flat top Sampling, quantization, PCM system; compounding.

Differential PCM, Delta modulations. Adaptive dettta modulation.

Module – IV

Communication System and Noise Calculation

Resistor Noise, available Power, Noise Temperature,
Two Ports, Noise band width, effective input – Noise Temperature
Noise Figure.
Noise Figure and equivalent Noise Temperature of a cascade.

Text Books :
Principles of Communication Systems, Herbert Taub, Donald L Schilling, Tata McGraw Hill
3.1,3.4-3.13, 4.2, 4.4 - 4.5, 4.10 - 4.16, 4.20, 5.1 - 5.12, 5.14 - 5.16, 14.1 – 14.11

Reference :
Communication System by Simon Hykin

PEBT 8301 BIO INFORMATICS (3-0-0)

Module I 12 Hours

Introduction to Genomic data and Data Organization : Sequence Data Banks - introduction to sequence data banks - protein sequence data bank. NBFR-PIR. SWISSPORT. Signal peptide data bank, Nucleic acid sequence data bank -GenBank, EMBL nucleotide sequence data bank. AIDS virus sequence data bank. PRNA data bank, structural data banks - protein Data Bank (PDB). The Cambridge Structural Database (CSD) : Genome data bank - Metabolic pathway data ; Microbial and Cellular Data Bank.

Module II 12 Hours

Introduction to MSDN (Microbial Strain Data Network) : Numerical Coding Systems of Microbes, Hibridoma Data Bank Structure, Virus Information System Cell line information system ; other important Data banks in the area of biotechnology/life sciences/biodiversity.

Sequence analysis : Analysis Tools for Sequence Data Banks : Pair wise alignment - NEEDLEMAN and Wunsch algorithm, Smith Waterman, BLAST, FASTA algorithms to analyze sequence data ; Sequence patterns motifs and profiles.

Module III 10 Hours

Secondary Structure Predictions ; prediction algorithms; Chao-Fasman algorithm. Hidden-Markov model, Neural Networking.
Tertiary Structure predictions ; predication algorithms ; Chao-Fasman algorithm. Hidden-Markov model, Neural Networking.

Module IV 10 Hours

Applications in Biotechnology : Protein classifications, Fold libraries, Protein structure prediction : Fold recognitions (threading), protein structure predictions : Comparative modeling (Homology), Advanced topics : Protein folding, Protein-ligand interactions, Molecular Modeling & Dynamics, Drug Designing.

Books :

1. Lesk, Introduction to Bio Informatics, OUP
2. Introduction to Bio-informatics, Atwood, Pearson Education
3. Developing Bio-informatics Computer Skills, Cynthia Gibas and Per Jambeck.2001 SPD
4. Statistical Methods in Bio-informatics, Springer India
5. Beginning Perl for Bio-informatics, Tisdall. SPD
6. Biocomputing ; Informatics and Genome Project, Smith, D.W. 1994, Academic Press, NY
7. Bioinformatics ; A practical Guide to the Analysis of Genes and proteins. Baxevains. A.D. Quellette, B.F.F., John Wiely & Sons.
8. Murty CSV, Bioinformatics, Himalaya

PRACTICALS
BCSE 9304 OPERATING SYSTEM LAB. (0-0-3)

1. Study of UNIX Command
2. Introduction to LINUX (Any distribution can be used)
3. Shell scripting for UNIX/ LINUX systems
4. Study of Windows NT/ 2000 features
5. Study of File systems : UNIX/ FAT/ NTFS
6. Introduction to the Windows Registry
7. A study project on any one aspect of modern operating systems

CPEC 9304 DIGITAL SIGNAL PROCESSING LAB. (0-0-3)

1. Simulation of Various DSP fundamental in Mat Lab or C
2. Design of Filters in MAT Lab or C
3. Some experiments on DSP on trainer Kits on any brand (TI, Analog Etc) involving study of the processor commands and processor architecture. The student should understand how the DSP Chip Architecture is different from the Architecture of a general purpose processor

COURSE STRUCTURE
FOURTH YEAR B.TECH PROGRAMME
INFORMATION TECHNOLOGY

7th Semester				8th Semester			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
HSSM 4403	Environmental Engineering	3-0-0	3	HSSM 4404	Marketing Management	3-0-0	3
BCSE 3401	Computer Graphics & Multimedia	3-0-0	3	BCSE 3404	E-Commerce & ERP	3-0-0	3
BCSE 3402	Software Engineering	3-0-0	3	PEEC 5409	Mobile Computing	3-0-0	3
BCSE 3403	Internet & Web Technologies	3-0-0	3		**Elective - IV & V**	6-0-0	6
	Elective - II & III	6-0-0	6	PECS 3405	Embedded Systems		
PECS 3401	Soft Computing			PECS 3406	Computer Security		
BCSE 3407	VLSI System Design			PECS 3407	Parallel & Distributed Systems		
PECS 3402	Advanced Operating Systems			PECS 3408	Image Processing		
PECS 3404	Compiler Design						
	Total		**18**		**Total**		**15**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
BCSE 9401	Project		3	BCSE 9405	Project		7
BCSE 9402	Internet Technologies Lab.	0-0-3	2	BCSE 9406	Seminar		1
BCSE 9403	Computer Graphics Lab.	0-0-3	2	BCSE 9407	Entrepreneurship Project	0-0-3	2
BCSE 9404	Seminar		1	BCSE 9408	Comp. Viva Voce		2
			8				**12**
	Total		**26**		**Total**		**27**

L-Lecture **T-Tutorial** **P-Practical**

7th Semester

HSSM 4403 ENVIRONMENTAL ENGINEERING (3-0-0)

Objective : This course introduces the students to the environmental consequences of Industries, development actions etc. and the methods of minimizing their impact through technology and legal systems.

Module – I

Ecological Concepts and Natural Resources : Ecological perspective and value of environment. Environmental auditing, Biotic components, Ecosystem Process : Energy, Food Chain, Water cycle, Air cycle etc., Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law, Global Perspective.

Chemistry and Microbiology in Environmental Engineering : Physical and chemical properties of water, Atmospheric chemistry, Soil chemistry, Microbiology, Chemical and biochemical reactions, Material balances and Reactor configurations.

Concept in Hydrology : Hydrological cycle, Water balance, Energy budget, Precipitation, Infiltration, evaporation and evapotranspiration, Rainfall-runoff relationships, Urban hydrology, Ground water, Ground water chemistry, Water contamination and pollution prevention.

Module – II (9 hours)

Water Pollution : water quality standards and parameters, Assessment of water quality, Aquatic pollution, Freshwater pollution, Estuarine water quality, Marine pollution, Organic content parameters, DO and BOD demand in streams, Transformation process in water bodies, Oxygen transfer by water bodies, Turbulent mixing, Water quality in lakes and preservers , Ground water quality.

Air Pollution : Air pollution and pollutants, criteria pollutants, Acid deposition, Global climate change – green house gases, non-criteria pollutants, emission standard form industrial sources, air pollution metereology, Atmospheric dispersion.

Noise Pollution : Physical Properties of sound, Noise criteria, Noise Standards, Noise measurement, Noise control.

Module – III (15 hours)

Water Treatment : Water quality standards, Water sources and their quality, Water treatment processes, Pre-treatment of water, Conventional process, Advanced water treatment process.

Waste Water Treatment : Water flow rate and characteristics, Design of waste water network, Waste water treatment process, pretreatment, primary and secondary treatment of waste water, Activated sludge treatment : Anaerobic digestion and its microbiology, Reactor configurations and methane production. Application of anaerobic digestion. Bio-solids regulations, Characteristics and processing of bio-solids, first and second stage processing of sludge. Sludge disposal,. Integrated sewage and sludge management.

Solid Waste Management
Source classification and composition of MSW : properties and separation, storage and transportation, MSW Management, Waste minimization of MSW, Reuse and recycling, Biological treatment, Thermal treatment, Landfill, Integrated waste management.
Hazardous Waste Management, Hazardous waste and their generation, Medical hazardous waste, Household waste, Transportation and treatment of hazardous waste : Incinerators, Inorganic waste treatment, Treatment systems for hazardous waste, handling of treatment plant residue.

Industrial Air Emission Control :

Characterization of air stream, Equipment selection, Equipment design, Special Methods : Flue gas desulphurization, NOx removal, Fugitive emissions.

Module – IV (8 hours)

Waste Minimization : Concept, Life Cycle Assessment, Elements of waste minimization strategy, Benefits of waste minimization, Elements of waste minimization programme, Waste reduction techniques.

Environment impact Assessment, Origin and procedure of EIA, Project Screening for EIA, Scope studies, Preparation and review of EIS.

Reference :

1. Environmental Engineering Irwin/ McGraw Hill International Edition, 1997, G. Kiely,
2. Principles of Environmental Engineering and Science, M. L. Davis and S. J. Masen, McGraw Hill International Edition, 2004
3. Environmental Science, Curringham & Saigo, TMH,
4. Principles of Environmental Science, Curringhum
5. Introduction to Environmental Science, Y. Anjaneyalu, B. S. Publication.

BCSE 3401 COMPUTER GRAPHICS & MULTIMEDIA (3-0-0)

Module – I (10 hours)

A Survey of Computer Graphics : Computer Aided Design, Presentation Graphics, Computer art, Entrainment, education and Training, Visualization, Image Processing, graphical User Interface

Overview of Graphics System :Video Display Devices, Raster-Scan and Random Scan Systems, Input Devices, Hard Copy Devices, Graphics Software

Graphic User Interface and Interactive Input Methods : The User Dialogue, Input of graphical Data, input Function, Initial Values for input Device parameters, Interactive Picture construction.

Output Primitives : Points and lines Bresenham's Line Algorithm, Midpoint Circle Algorithm, Filled Area Primitives

Attributes of Output Primitives : Line Curve, Color, Are fill and Character Attributes, Bundled Attributes, Antialiasing

Module – II (8 hours)

Two Dimensional Geometric Transformation : Basic Transformation (Translation, rotation, Scaling) Matrix Representation and Homogeneous coordination, Composite Transformations, Reflection Shears, Transformation between coordinate system.

Two Dimensional Viewing : the viewing Pipeline Viewing coordinate Reference frame, window-to view port coordinate Transformation.

Line Clipping (Cohen-Sutherland Algorithm) and Polygon Cliping (Stherland-Hodgeman Algorithm)

Module –III (12 hours)

Three Dimensional Object Representation : Polygon Surface, quadratic Surface, Spline Representative, Bezier Curves and Surfaces B-Spline Curves and surfaces.

Fractal Geometry Methods : Fractal Generation Procedure, Classification of Fractarals Dimension, geometric Construction of Deterministic self similar Implementation of the above using Open GL

Three Dimensional Geometric and Modeling Transformations : Translation Rotation, Scaling, Reflections, shear, Composite Transformation, Modeling and Coordinate Transformation

Three Dimensional Viewing : Viewing Pipeline, Viewing Coordinates, Projections (Prallel and Prospective) Clipping

Implementation of above using openGL

Module –IV (8 hours)

Visible Surface Detection Method : Backface Detection, Depth Buffer, A Buffer, Scan line and Depth sorting

Illumination Models : Basic Models, Displaying Light Intensities, Halftone Pattern and Dithering Techniques

Surface Rending Methods : Polygon Rendering Methods, Gouraud and Phong Shading

Quick Introduction to Computer Animation
Implementation of above using OpenGL

Textbook :

1. Computer Graphics, D. Hearn and M.P. Baker (C Version), Prentice Hall, 1999
2. Open GL Super Bible, R.S. Wright and M. Sweet, Tech Media.

Reference Book :

1. Computer Graphics Principle and Practice , J.D. Foley, A.Dam, S.K. Feiner, Addison, Wesley
2. Edward Angel – Interactive Computer Graphics- A Top Down Approach with OpenGL

BCSE 3402 SOFTWARE ENGINEERING (3-0-0)

Module – I

Evolution and impact of Software engineering, SW lifecycle models SW project Management; Requirement analysis and specification.

Module – II

Software design, function oriented software design, object modeling wring UML, object Oriented software development, user interface design.

Module – III

Coding & Testing, Reliability and Quality management.

Module – IV

Computer aided software engineering, software maintenance, software reuse.

Text Book :

Fundamentals of Software Engineering – Rajib Mall. (PHI – 2nd Edition)

BCSE 3403 INTERNET AND WEB TECHNOLOGY (3-0-0)

The Internet and WWW

Understanding the WWW and the Internet, Web Architecture, Major issues in web solution development, Web servers (details of Apache Web Server), Web Browsers (Microsoft Internet Explorer and Netscape Navigated)

HTML

Planning of Web page, Model and structure for a Website, designing Web pages, Basic HTML using images links, HTTP methods and forms, Tables, Multimedia content (Audio and Video) Frames

CGI Basics

Introduction to CGI, CGI building blocks, CGI Scripting in C, CGI Security

JAVA Script

Programmng Fundamentals, built in object, Form object and elemnt, Adavnce Java Script objects, Working with data, Flow Control Structures, Operator, Custom function and Object, Data entry and Validation, Tables and Forms, Security Issues

VB Scripts

VB Script functionality, Active X controls, Active Server Pages, Error Handling, VB Script Controls, Web Based application

Textbooks :

There are large numbers of good books available in each topic. Instructor are advised to use their library resources.

Reference Books :

1. Internet Read-Map, Benett Falk, BPB Publication
2. HTML complete reference, Powell, TMH
3. Rese Colderun, Teach yourself CGI Programming in 7 days, Tech Media 1998
4. Danni Goodman, Java Script Bible, 2nd Ed. Comdex Computer Pub.1997
5. Professional ASP 3.0, Alles Homer & David Susmen, SPD Publication

PECS 3401 SOFT COMPUTING (3-0-0)

Module - I

Neural Networks :
Fundamentals of Neural Networks: Models of an artificial Neuron, Neural Network Architecture, Learning methods

Back Propagation Networks:
Architecture of a Back propagation Network : back propagation, Learning Effect of Tunning parameters of the Back propagation Neural Network, variation of standard Back Propagation Algorithms.

Module – II

Associative memory : Auto correlators, Kosko's Discrete BAM, Exponential BAM, Associative memory for Real-coded Pattern Pairs, Applications.

Adaptive Resonance Theory :
ART1,ART2, Applications

Module –III
FUZZY LOGIC
Fuzzy set theory: crisp sets, fuzzy sets, crisp relations, fuzzy relations, Fuzzy Systems: Crisp logic predicate logic, fuzzy logic, fuzzy Rule based system, Defuzzification Methods.

GENETIC ALGORITHMS
Fundamentals of genetic algorithms: Encoding, Fitness functions, Reproduction.
Genetic Modeling :

Cross cover, Inversion and deletion, Mutation operator, Bit-wise operators, Bitwise operators used in GA. Convergence of Genetic algorithm. Applications , Real life Problems.

Module – IV

Hybrid Systems :

Hybrid system, neural Networks, fuzzy logic and Genetic algorithms hybrids.

Genetic Algorithm based Back propagation Networks:

GA based weight determination applications:

Fuzzy Back Propagation Networks, Fuzzy Associative Memories: Single Association FAM, Fuzzy Hels FAMS,

Fuzzy logic controlled genetic Algorithms soft computing tools,

Fuzzy constraints, GA in fuzzy logic controller design, Applications.

Text Book :

Neural Networks, Fuzzy Logic, and Genetic Algorithm (synthesis and Application)

S.Rajasekaran, G.A. Vijayalakshmi Pai, PHI

Reference Book :

1. Neuro Fuzzy and Soft Computing, J. S. R. JANG,C.T. Sun, E. Mitzutani, PHI

BCSE 3407 VLSI SYSTEM DESIGN (3-0-0)

Module – I (10 hours)

Introduction, Historical perspective, VLSI Design methodologies, VLSI Design Flow, Design Hierarchy, Design Styles, CAD Technology . Fabrication of MOSFETS, Fabrication processes, NMOS Fabrication, CMOS n-well process, Layout Design rules, Stick Diagrams, Full Custom Mark Layout Design, MOS Transistor, Review of structure and operation of MOSFET (n-MOS enhancement type), CMOS, MOSFET v-I characteristics , MOSFET scaling and small geometry effects, MOSFET capacitances, Modeling of MOS Transistors- Basic concept the SPICE level-1 models, the level –2 and level –3 model equations.

Module – II (10 hours)

MOS Inverters : Basic NMOS inverters, characteristics , inverters with resistive load and with n-type MOSFET load, CMOS inverter and characteristics .

MOS inverters : Switching characteristics and interconnect effects: Delay time definitions and calculation, inverter design with delay constraints , estimation of parasitics switching power dissipation of CMOS inverters.

Module –III (10 hours)

Combinational MOS logic circuits, CMOS logic circuits , state style, complex logic circuits, pass transistor logic, sequential logic circuit – introduction, SR latch, clocked latch & flip-flop circuits , CMOS D latch and edge triggered flip-flop .

Dynamics logic circuits : Dynamic logic, basic principles, high performance dynamics CMOS circuits, Dynamic Ram, SRAM, flash memory.

Module – IV (12 hours)

Systems Design method, design strategies, concept of FPGA, standard cell based design, design capture tools, hardware definition languages such as VHDL and packages. Xlinx (introduction), introduction to IRSIM and GOSPL (open source packages) , design verification and testing , simulation at various levels including timing verification, faults models. Design strategies for testing chip level and system level test techniques.

Text Books :

1. CMOS Digital integrated Circuits – Analysis & Design – Sung Mo-Kang & Yussuf Leblebici, TMH.
2. VHDL Programming by example –Perry TMH.
3. Digital Integrated Circuit, J.M. Rabey, Chandrasan, Nicolic, Pearson
4. CMOS Digital Integrated Circuit, B.M. Kang & Y Leblebici, TMH
5. Modern VLSI Design, Wayne Wolf, Pearson
6. Algorithm for VLSI Design and Automation, N. Sherwani, Kluwer
7. VHDH, Bhaskar, PHI

Reference Books :

1. Digital Integrated Circuits : A Design Perspective – Rabey et.al. Pearson Education.
2. VLSI design Techniques for analog and digital circuits – Geiger et. Al. McGraw Hill.

PECS 3402 ADVANCED OPERATING SYSTEM (3-0-0)

Process Synchronization :
Concept of processes, Concurrent processes, Threads, Overview of different classical synchronization problems, Monitors, Communicating sequential processes (CSP)

Process dedlocks :
Introduction causes of deadlocks, Deadlock handling strategies Models of deadlock.

Distributed operating system :
Architectures, Issues in Distributed operatig systems, Limitations of Distributed Systems, Lamports logical clock, Global states, Chandy-Lampert's global state recording algorithm, Basic concepts of Distributed Mutual Exclusion, Lamport's Algorithm, Ricat-Agrawala Algorithm: Basic concepts of Distributed deadlock detection, Distributed File system, Architecture, Design issues, SUN Network File system.
Basic concepts of Distributed shared memory, Basic concepts of Distributed Scheduling, Load balancing, Load sharing.

Distributed OS Implementation :
Models, Naming, Process migration, Remote Procedure Calls.
Multiprocessor System :
Motivation, Classification, Multiprocessor Interconnections, Types, Multiprocessor OS functions & requirements; Design & Implementation Issue; Introduction to parallel programming; Multiprocessor Synchronization.

Performance, Coprocessors, RISC & data flow :
Introduction, Necessity, Measures, Techniques, Bottlenecks & Saturation, Feedback loops, Coprocessors, RISC.

Analytic Modeling :
Introductions, Queing Theory, Markov Process.

Security & Protection :
Security-threats & goals. Penetration attempts, Security Policies & mechanisms, Authentication. Protections & access control Formal models of protection Cryptography, worms & viruses.

Text Books:

1. Operating System Concepts & Design , Milan Milenkovic, TMH
2. Operating System, H.M. Beitel, Pearsons,
3. Advanced Concepts in operating Systems, Mukesh singhal and Niranjan G. Shivaratri, TMH

PECS 3404 COMPILER DESIGN (3-0-0)

Overview of systems, Software and programming language, Compiler and translators, Automatic generation of lexical analysers, Syntax analysis, parsing of contex free language, Top down and bottom-up parsing techniques, deterministic parsor concept, Recurive descent parsor, LL (1), SLR

and LALR, Error detection, Correction and recovery, syntax dircied translation, Semantic analysis, Symbol table organization and routine allocation, Register allocation and code generation and optimization.

Text Book :

1. Principle of Compiler Design, A.V. Aho and J.D Ullman, Addition –Wesley
2. Principle of Compiler Design, A.V.T. Aho, and Rabi Sethi, Addition-Sesley

PRACTICALS
BCSE 9402 INTERNET TECHNOLOGY LAB. (0-0-3)

1. Introduction to major internet protocol- HTTP, FTP, SMTP
2. Study of Web Browser- Microsoft Internet Explorer and Netscape Navigator. Their Network options, security features, Cookies, file cashing, temporary files etc.
3. HTML- Basics of HTML., text, image, other MIME types, lists, tables, HTTP methods, forms.
4. Multimedia on the Web- Embeddig audio and video files in HTML
5. Java Script- Introduction to Java Script for client side validation.
6. Serves side scripting – Introduction to fundamentals concepts of ASP or JSP or PHP (any one platform depending on instructor). Basics of CGI scripting using Perl or C. Simple examples of request/ response objects. Basic introduction to web solutions architecture.

BCSE 9403 COMPUTER GRAPHICS LAB. (0-0-3)

Compulsory :

1. Learning graphics functions in C, C++.
2. Bresenham's line drawing algorithm.
3. DDA line drawing algorithm.
4. Bresenham's algorithm for generation of octant of a circle.
5. Bresenham's algorithm for generation of quadrant of an ellipse.
6. Polygon filling algorithm (FLOODFILL / SEEDFILL)
7. Cohen-Sutherland clipping algorithm.
8. Mid-point sub-division clipping algorithm.

Any Two :

9. Reflection of a given point about a given axis.
10. Olympic Logo, not using function.
11. Polygon clipping using Sutherland Hodgemann algorithm.

Any Two :

12. Generating a ball, bouncing across the screen of the display.
13. A straight line, rotating about the perimeter of a given circle.
14. Z-buffer algorithm for hidden surface elimination.

8th Semester

HSSM 4404 MARKETING MANAGEMENT (3-0-0)

Objective of the Course : The course aims at introducing the basic concepts of marketing to the undergraduate students in engineering. The learning shall help the students in better designing, manufacturing and selling product/ service packages keeping competitive market, customers and cost in view.

Module – I (9 hours)

Marketing Management : Concept, Process, Functions and relevance in the current context.

Marketing Environment : Socio-economic forces. Competition : national and global, Technology, Government Policy, Suppliers, Buyers, Consumer Resistance considerations. Environment scanning tools and techniques

Competition Analysis : Factors contributing to competition, Competition analysis tools, Competitive arena mapping, Segmentation matrix.

Market Planning : Exploring Opportunity, Product –market selection, Approaches to Market Planning, Market Planning Process.

Module II (10 hours)

Market Research and Information Systems : Research Process, The Internet and World Wide Web based Information collection and processing, Database, Data Warehouses and Data Mining, Global Market Research, Competitive Intelligence.

Consumer Behaviour : Importance of buyer and his/ her role in purchasing. Influence of buyer behaviour, Buyer behaviour study tools. Organizational buying behaviour.

Market Segmentation, Targeting and Positioning : Definition, Bases and Methods of segmenting consumer and Industrial markets. Target Market strategies: Domestic and global perspective. Market Positioning.

Market Demand Forecasting : Key Terms, Forecasting Tools : Short term tools : Moving average and Exponential smoothing methods, Long-term forecasting Tools : Time series analysis, Econometrics methods, Qualitative tools : Buying Intention Survey, Sales Force Opinion and Delphi Techniques.

Module – III (11 hours)

Product Planning : Product Life Cycle, Locating products in PLC, New Product Development Process, Branding Strategy, Positioning a Brand, Brand Equity, Packaging and Labeling, Product-mix and Product Line, Product-Mix strategies, Planned Obsolescence.

Pricing Decision : Objectives and Factors influencing pricing, Cost-Plus Pricing, Breakeven Analysis, Price Based on Marginal Analysis, Price Elasticity of Demand, Operating statement, Markups Analysis

Ratios, Pricing Strategies : Market-Entry, Discounts and allowances, Geographic Pricing, Special Pricing.

Promotion Decisions : Marketing Communication and Promotion Process, Promotion Mix, Advertising : Media and Media selection process. Organising for advertising, sales promotion.

Module –IV (10 hours)

Channels of Distributions : Designing Distribution Channels, Wholesaling and Physical Distribution, Retailing. Supply Chain Management (Basic only). Personal selling, Direct Marketing, Managing Sales Force.

Trends in Marketing : Global Marketing, Customer Services, Customer Relationship Management, Rural Marketing and Service Marketing.

References :

1. M. J. Etazel , B. J. Walker and W. J. Stanton, Marketing, Tata McGraw Hill, 13th Edition, 2004.
2. R. Saxena, "Marketing Management" Tata McGraw Hill, second Edition, 2003.

BCSE 3404 E-COMMERCE & ERP (3-0-0)

Module - I (10 hours)

Electronic Commerce : Overview, Definitions, Advantages & Disadvantages of E-Commerce, Threats of E-Commerce, Managerial Prospective, Rules & Regulations for Controlling E-Commerce, Cyber Laws.

Technologies : Relationship Between E-Commerce & Networking, Different Types of Networking for E-Commerce, internet, Intranet, EDI Systems

Wireless Application Protocol : Definition, Hand Held Devices, Mobility & Commerce, Mobile Computing, Wireless Web, Web Security, Infrastructure Requirement for E-Commerce.

Business Models of E-commerce ; Model Based on Transaction Type, Model Based on Transaction Party - B2B, B2C, C2B, C2C, E-Governance.

Module - II (11 hours)

E-strategy : Overview, Strategic Methods for developing E-Commerce.

Four C's (Convergence, Collaborative Computing, Content Management & Call Centre).

Convergence : Technological Advances in Convergence - Types, Convergence and its implications, Convergence & Electronic Commerce.

Collaborative Computing : Collaborative product development, contract as per CAD, Simultaneous Collaboration, Security.

Content Management : Definition of content, Authoring Tools and Content Management, Content - partnership, repositories, convergence, providers, Web Traffic & Traffic management : Content Marketing.

Call Centre : Definition, Need, Tasks Handled, Mode of Operation, Equipment, Strength & Weaknesses of Call Centre, Customer Premises Equipment (CPE). [6L]

Supply Chain Management : E-logistics, Supply Chain Portal, Sypply Chain planning Tools (SCP Tools), Supply Chain Execution (SCE), SCE - Framework, Internet's effect on Supply Chain Power.

Module - III (08 hours)

E-Payment Mechanism ; Payment through card system, E-Cheque, E-Cash, E-Payment Threats & Protections.
E-Marketing : Home - shopping, E-Marketing, Tele-marketing
Electronic Data Interchange (EDI) : Meaning, Benefits, Concepts, Application, EDI Model, protocols (UN EDI FACT / GTDI, ANSIX - 12, Data Encryption (DES / RSA)
Risk of E-Commerce : Overview, Security for E-Commerce, Security Standards, Firewall, Cryptography, Key Management, Password Systems, Digital Certificates, Digital Signatures.

Module - IV (11 hours)

Enterprise Resource Planning (ERP) : Features, capabilities and Overview of Commercial Software, re-engineering work processes for IT applications, Business Process Redesign, Knowledge Engineering and Data Warehouse.

Business Modules ; Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials, Management, Quality Management Sales & Distribution ERP Package.

ERP Market ; ERP Market Place, SAP AG, PeopleSoft, BAAN, JD

Edwards, Oracle Corporation.

ERP-Present and Future : Enterprise Application Integration (EAI),

ERP and E-Commerce, ERP and Internet, Future Directions in ERP

Reference Book :

1. E-commerce. MM Oka, EPH
2. Kalakotia, Whinston : Frontiers of Electronic Commerce, Pearson Education.
3. Bhaskar Bharat ; Electronic Commerce - Technologies & Applications. TMH.
4. Loshin pete, Murphy P.A. : Electronic Commerce, Jaico Publishing Housing
5. Murthy : E-Commerce, Himalaya publishing.
6. E-commerce : Strategy Technologies & Applications, Tata McGraw Hill.
7. Global E-Commerce, J. Christopher & T.H.K. Clerk, University Press
8. Beginning E-Commerce, Reynolds, SPD
9. Krishnamurthy, E-Commerce Mgmt. Vikas.

PEEC 5409 MOBILE COMPUTING (3-0-0)

Module - I (10 hours)

Introduction to Personal Communications Services (PCS) : PCS Architecture, mobility management, Networks signaling, Global System for Mobile Communication (GSM) System overview : GSM Architecture, Mobility management, Network signaling.
General Packet Radio Services (GPRS) : GPRS Architecture, GPRS Network Nodes, Mobile Data Communication ; WLANs (Wireless LANs) IEEE 802.II standard, Mobile IP.

Module - II (15 hours)

Wireless Application Protocol 9WAP) : The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML), Wireless Local Loop (WLL) : Introduction to WLL Architecture, wireless Local Loop Technologies.

Third Generation (3G) Mobile Services : Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Module - III (08 hours)

Global Mobile Satellite Systems ; case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks : Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

Module - IV (10 hours)

Server-side programming in Java, Pervasive web application architecture, Device independent example application. **Text Book :**

1. "Pervasive Computing", Burkhardt, Pearson
2. "Mobile Communication", J. Schiller, Pearson
3. "The Wireless Application Protocol", Sandeep Singhal, Pearson
4. "Mobile and Personal Communication Systems and Services", Raj Pandya, Prentice Hall of India, 2001.

Reference :

1. "Guide to Designing and Implementing Wireless LANs", Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
2. "Wireless Web Development", Ray Rischpater, Springer Publishing
3. "The Wireless Application Protocol", Sandeep Singhal, Pearson.
4. "Third Generation Mobile Telecommunication Systems", by P. Stavronlakis, Springer Publishers,

PECS 3405 EMBEDED SYSTEM (3-0-0)

Module – I

Introduction : An embedded system, Processor in the system, other hardware units, software embedded into a systems, exemplary embedded system-on-chip (SOC) and VLSI circuit

Module – II

Devices and Device Drivers ; I/O devices, Timer and counting devices, serial communication using the IC, CAN and advance I/O buses between the networked multiple devices, Host system or computer parallel communication between the networked I/O multiple devices using the ISA, PCI, PCI-X and advance buses, Device drivers, Parallel port devices drivers in a system, Serial port device drives in a system, Interrupt servicing (Handling) mechanism.

Module – III

Software and Programming Concept : Processor selection for an embedded system, memory selection for an embedded system, Embedded programming in C ++, Embedded programming in JAVA, Unified modeling language (UML), Multiple processes and application, problem of sharing data by multiple tasks and routines, Inter process communication.

Real time Operating System : Operating system services, I/O subsystem, Network operating system, Real Time and embedded system, Need of well tested and debugged Real time operating system (RTOS), Introduction to C/ OS- II.

Module –IV

Case studies of programming with RTOS : Case study of an embedded system for a smart card

Hardware and Software Co-design : Embedded system project management, Embedded system design and co-design issues in system development process, design cycle in the development phase for an embedded system, Use of software tools for development of an embedded system, Issues in embedded system design.

Text Book :

1. Embedded System Architecture, Programming and Design, Raj Kamal, TMH
2. Hardware Software Codesign of Embedded System, Ralf Niemann, Kulwer Academic
3. Embedded Real time system Programming, Sriram V. Iyer and Pankaj Gupat, TMH

PECS 3406 COMPUTER SECURITY (3-0-0)

Module – I

The Security Problem in Computing:

The meaning of computer Security, Computer Criminals, Methods of Defense, Elementary Cryptography: Substitution Ciphers, Transpositions, Making "Good" Encryption Algorithms, The Data Encryption Standard, The AES Encryption Algorithm, Public Key Encryptions, Uses of Encryption.

Module – II

Program Security:

Secure Programs, Nonmalicious Program Errors, viruses and other malicious code, Targeted Malicious code, controls Against Program Threats, Protection in General-Purpose operating system protected objects and methods of protection memory and addmens protection, File protection Mechanisms, User Authentication Designing Trusted O.S: Security polices, models of security, trusted O.S design, Assurance in trusted OS. Implementation examples.

Module – III

Data base Security :

Security requirements, Reliability and integrity, Sensitime data, Inference, multilevel database, proposals for multilevel security.

Security in Network:

Threats in Network, Network Security Controls, Firewalls, Intrusion Detection Systems, Secure E-mail.

Module – IV

Administering Security :

Security Planning, Risk Analysis, Organisational Security policies, Physical Security.

Legal Privacy and Ethical Issues in Computer Security:

Protecting Programs and data, Information and the law, Rights of Employees and Employers, Software failures, Computer Crime, Praia, Ethical issues in Computer Security, case studies of Ethics.

Text Book:
Security in Computing Third Edition Charles P. Pfleeger, shari Lawrence Pfleeger. PHI.

PECS 3407 PARALLEL AND DISTRIBUTED SYSTEMS (3-0-0)

Module – I

Introduction to parallel computing Motivation and scope. Parallel Programming Platforms:

Trends in microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of parallel Computing platforms, physical Organization of parallel platforms, communication costs in parallel Machines, Routing Mechanisms for interconnection Network, Impact of Process Processors mapping and mapping Techniques.

Module – II
Principles of parallel Algorithm Design:

Preliminaries, Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for load Balancing, Methods for containing. Interactions overheads, Parallel Algorithm Models. Basic Communication Operations: One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and reduction All-Reduce and Prefix sum operations, scatter and Gather, All-to-All personalized communication, circular shift, Improving the speed of some communication operation.
Module – III

Analytical Modeling of Parallel Programms:

Performance Metrics for Parallel systems, Effect of Granularity of Performance, scalability of parallel system, Minimum Execution Time and Minimum Cost-optimal execution Time, Asymptotic Analysis of parallel Programs, other scalability Metrics. Programming Using the message passing Paradigm:

Principle of Message – Passing Programming, Send and receive Operations, The message passing Interface, Topologies and Embedding, Overlapping communication with computation, collective communication and computation Operations, Groups and Communicators.

Module – IV
Dense Matrix Algorithm:
Matrix-vector Multiplication, Matrix-Matrix algorithm, Solving a System of linear equations.

Sorting:
Bubble Sort and its variants, Quick Sort.

Graph Algorithms:
Minimum Spanning Tree (Prim's Algorithm) shortest path (Dijkstra's Algorithm)

Text Book:
Introduction to Parallel Computing, Second Edition, Ananth Gram, Anshul Gupta, George Karypis, Vipin Kumar Person Education. Chapters : 1,2,3,4,5,6,8 ,9.3,9.4,10.2,10.3,10.4

PECS 3408 IMAGE PROCESSING (3-0-0)

Module I (8 hours)

Digital Image Representation, Digital Image Processing System, Visual Perception, Sampling and Quantization, relationship between Pixels, Fourier Transforms, Walsh, Hadamard and Discrete Cosine Transforms.

Module – II (8 hours)

Spatial and Frequency domain methods, Enhancement by point Processing, Spatial Filtering, Enhancement in the Frequency Domain, Generation of Spatial Masks from Frequency Domain Specifications, Colour Image Processing.

Module III (8 hours)

Image Restoration

Degradation Model, Diagonalization of Circulant and Block Circulant of Matrices. Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filter, Constrained Least squares restoration, Iterative Restoration, Restoration in the Spatial Domain.

Module – IV (16 hours)

Image Compression

Fundamentals, Image Compression Models, Elements of Information Theory, Error-Free Compression, Image Compression Standards.

Image Segmentation

Detection of Discontinuity, Edge linking and Boundary Detection, Thresholding, Region-Oriented Segmentation , The use of Motion in Segmentation.

Text Books :

1. Digital Image Processing, R.C. Gonzalez & R.E Wood, Addison Wesley

Reference Book :

1. Digital Image Processing and Analysis, B. Channda & D. Dutta, Prentice Hall
2. Fundamentals of Digital Image Processing, Anil Ku Jain, PHI
3. Fundamental of Electronic Image Processing, Arther R. Weeks Jr. PHI

PRACTICALS

BCSE 9407 ENTREPRENEURSHIP PROJECT (0-0-3)

1. The project will be for 2 credits and 3 periods per week is to be devoted for the project.
2. The teacher has to give elementary idea about entrepreneurship through classroom teaching before a project report is prepared by the student.
3. The teacher will first cover the following topics through lecturer and exercises on motivation and games.
   - Entrepreneurship concept, EDP in India, Indian middle class value.
   - Entrepreneurial qualities, motivation perception, risk taking etc.
   - Market survey, Business opportunity guidance
   - Role of DIC, SFC, Bank etc.
   - Working capital assessment, Balance Sheet, Costing, Book keeping.
   - Decision making, Leadership, Communication skill
   - Preliminary Project Report, preparation for a specific product and submission of the report.
4. Evaluation

(a) The teacher has to conduct tests/ motivational exercises to assess entrepreneurial capability of the student (20%)

(b) The teacher has to test the knowledge of the student on the above topic through a written test. (20%)

(c) The teacher has to evaluate the report submitted by the student (i.e. Project report within 50 pages) (60%).

Reference Books :

1. Entrepreneurship of Small Industries, M. V. Deshpande, Deep and Deep Publication
2. Management of Small Scale Industry, Vasant Desai, Himalaya Pub. House