COURSE STRUCTURE

&

SYLLABUS
(3rd – 8th SEMESTER)

FOR B.TECH PROGRAMME
IN
ELECTRONICS & TELECOMMUNICATION ENGINEERING

BIJU PATNAIK UNIVERSITY OF TECHNOLOGY ORISSA,
ROURKELA

2007 - 2008

COURSE STRUCTURE
SECOND YEAR B.TECH PROGRAMME
ELECTRONICS & TELECOMMUNICATION ENGINEERING

3rd Semester				4th Semester			
Theory		*ContactHrs.*	*Credit*	*Theory*		*ContactHrs.*	*Credit*
		L-T-P				**L-T-P**	
BSCM 2201	Mathematics - III	3-1-0	4	BSCM 2202	Mathematics - IV	3-1-0	4
BENG 1208	Fluid Mechanics & Hydraulic Machines /	3-1-0	4	BENG 1201	Electrical Machines	3-1-0	4
CPES 5201	Network Theory				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		**20**		**Total**		**20**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
BENG 9202	Basic Electronics Laboratory	0-0-3	2	BENG 9201	Basic Electrical Engineering Laboratory	0-0-3	2
	or				or		
BENG 9201	Basic Electrical Engineering Laboratory			BENG 9202	Basic Electronics Laboratory		
BCSE 9201	Computer Lab (OOP)	0-0-3	2	BCSE 9202	Computer Laboratory (RDBMS)	0-0-3	2
BENG 9203	Mechanical Engineering Lab.	0-0-3	2	CPES 9201	Network & Devices Laboratory	0-0-3	2
	or						2
CPES 9201	Network & Devices Laboratory				or		
CPES 9202	Analog Electronics Laboratory	0-0-3	2	BENG 9203	Mechanical Engineering Lab.		
CPES 9203	Digital Electronics Laboratory			CPES 9203	Digital Electronics Laboratory	0-0-3	2
				CPES 9202	Analog Electronics Laboratory		
			8				**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

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

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 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 (2-0-0)

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 (16 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 LABAROTARY (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 LABORATORY (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 OOP WITH C++ LABORATORY (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 LABORATORY (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 LABAROTARY (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 LABORATORY (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.

CPES 9203 DIGITAL ELECTRONICS CIRCUITS LABORATORY (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.

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

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

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 (16 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.

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 LABORATORY (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 LABAROTARY (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 RDBMS LABORATORY (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 LABAROTARY (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 LABORATORY (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 LABORATORY (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.

CPES 9202 ANALOG ELECTRONICS CIRCUIT LABORATORY (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.

COURSE STRUCTURE
THIRD YEAR B.TECH PROGRAMME
ELCTRONICS AND TELECOMMUNICATION ENGINEERING

5th Semester				6th Semester			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
HSSM 4301	Optimisation in Engineering	3-0-0	3	HSSM 4302	Production & Operation Mgmt.	3-0-0	3
CPEC 5301	Analogue Comm. Techniques	3-1-0	4	CPEC 5304	Digital Comm. Techniques	3-1-0	4
CPEC 5302	Digital Signal Processing	3-0-0	3	CPEC 5305	Microprocessors & Microcontrollers	3-1-0	4
CPEE 5306	Power Electronics	3-0-0	3	CPEE 5302	Control System Engineering	3-0-0	3
CPEC 5303	Electronics Measurement & Measuring Instruments	3-0-0	3	CPEC 5306	Advanced Electronic Circuits	3-0-0	3
CPEE 5307	Electromagnetic Theory	3-1-0	4	CPEC 5307	Microwave Engineering	3-1-0	4
	Total		**20**		**Total**		**21**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
CPEC 9301	Analog Communication Lab.	0-0-3	2	CPEC 9303	Digital Communication Lab.	0-0-3	2
CPEE 9305	Power Electronics Lab.	0-0-3	2	CPEC 9304	Microprocessor & Microcontroller Lab.	0-0-3	2
CPEC 9302	Digital Signal Processing Lab.	0-0-3	2	CPEC 9305	Design & Simulation Lab.	0-0-3	2
			6				**6**
	Total		**26**		**Total**		**27**

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

CPEC 5301 ANALOGUE COMMUNICATION TECHNIQUES (3-1-0)

Module – I

(12 hours)

Spectral Analysis : Fourier Series ; The Sampling Function. The Response of a linear System. Normalized Power in a Fourier expansion. Impulse Response . Power Spectral Density. Effect of Transfer Function on Power Spectral Density. The Fourier Transform. Physical Appreciation of the Fourier Transform. Transform of some useful functions. Scaling, Time-shifting and Frequency shifting properties. Convolution, Parseval's Theorem. Correlation between waveforms; Auto-and cross correlation. Expansion in Orthogonal Functions. Correspondence between Signals and Vectors. Distinguishability of Signals.

Module - II (14 hours)

Amplitude - Modulation Systems :

A Method of Frequency translation . Recovery of baseband Signal . Amplitude Modulation, Spectrum of AM Signal . The Balanced Modulator . The Square law Demodular. DSB–SC, SSB-SC and VSB-SC - Their Methods of Generation and Demodulation. Carrier Acquisition . Phase-locked Loop (PLL). Frequency Division Multiplexing.

Frequency Modulation Systems:

Concept of Instantaneous Frequency. Generalized concept of Angle Modulation. Frequency modulation, Frequency Deviation, Spectrum of FM Signal with Sinusoidal Modulation. Bandwith of FM Signal Narrowband and wideband FM. Bandwith required for a Gaussion Modulated WBFM Signal. Generation of FM Signal . FM Demodulator . PLL, Preemphasis and Deemphasis Filters.

Module - III (12 hours)

Mathematical Representation of Noise :

Sources and Types of Noise. Frequency Domain Representation of Noise. Power Spectral Density. Spectral Components of Noise. Response of a Narrow band filter to noise. Effect of a Filter on the Power spectral density of noise. Superposition of Noises, Mixing involving noise . Linear Filtering. Noise Bandwidth.

Noise in AM Systems:

The AM Receiver , Super heterodyne Principle, Calculation of Signal Power and Noise Power in SSB-SC, DSB-SC and DSB+C. Figure of Merit, Square law Demodulation. The Envelope Demodulation. Threshold.

Module – IV (8 hours)

Noise in FM System :

Mathematical Representation of the operation of the Limiter Discriminator; Calculation of output SNR. Comparision of FM and AM. SNR Improvement using preemphasis. Multiplexing. Threshold in frequency modulation. The Phase locked Loop.

Text Books :

1. Principles of Communication Systems by Taub & Schilling, 2nd Edition. Tata Mc Graw Hill. Selected portion from Chapter 1, 3, 4, 7, 8, 9 and 10 .
2. Communication Systems by Siman Haykin, 4th Edition, John Wiley & Sons, Inc.

Additional Reading :

1. Modern Digital and Analogue Communication Systems by B.P. Lathi, 3rd Edition, Oxford University Press. Selected Portion from Ch. 2,3,4,5 and 12.

2. Digital and Analog Communication Systems by Leon W. couch, II, 6th Edition , Pearson Education Pvt. Ltd.

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

Module – I (10 hours)

Discrete Time Signals and System

Discrete Time Signals (Elementary examples , classification : periodic and a periodic Signals energy and Power signals , Even and Odd Signals) .

Discrete Time System :

Block diagram representation of discrete time systems, classification of discrete time systems –static and dynamic, time variant and time – invariant, linear and non-linear, casual and anti-casual, stable and unstable.

Analysis and response (convolution sum) of discrete - time linear LTI system, Recursive and Non-recursive discrete time system. Constant coefficient differences equations and their solutions, impulse response of LTI system , structures of LTI systems Recursive and Non-recursive realization of FIR system. Correlation of discrete time Signal.

Selected portions from Chapter 2 (2.1, 2.2,2.3,2.4,2.5, 2.6.1) of Textbook – I

Chapter 1 of Textbook- 2.

Module – II (10 hours)

The Z transform

The Z-transform and one-sided Z-transform, properties of Z-transform , inverse of the Z-transform , Solution of difference equations.

Selected portions from Chapters 3 (3.1, 3.2,3.5) of Textbook – I

Selected portion of chapter 4 of Textbook - 2

The Discrete Fourier Transform

The DFT and IDFT, relationship , DFT with Z- transform , the DFT as a linear transformation Relationship of DFT with Z-transform , properties of DFT: periodicity, linearity, summery and time reversal of a sequence.

Circular convolution, circular correlation, circular correction by convolution, method linear convolution by overlap save methods and by overlap add method, Circular convolution and correlation by DFT method, Overlap add and save filtering by DFT method.

Selected portion from Chapter – 5 (5.1.2,5.1.3,5.1.4,5.2,5.2.1,5.2.2, 5.2.3, 5.3.2) of textbook – 1.

Selected portion of chapter 6 of textbook - 2.

Module- III (10 hours)

Fast Fourier Transform :

Operation counts by direct copulation of DFT, Radix – 2 FFT algorithm- Decimation –in-time (DIT) and Decimation – in frequency (DIF) algorithm, Efficient computation DFT of Two real sequences , Efficient Computation of DFT of a 2 N-pt real sequences.

Selected portions from chapter 6 (6.1.1,6.1.3, 6.2.1, 6.2.2) of Text book –I

Selected portions from chapter 7 and 8 of Text book – 2.

Design and Digital Filters:

Casually and its implication, Design of linear phase FIR filters using different windows. Design of IIR filters – Impulse Invariance Method and Bilinear transformation method.

Selected portions from chapter 8 (8.1.1, 8.2.1, 8.2.2., 8.3.2,8.3.3.) of Text book – I

Module – IV (10 hours)

Estimation of spectra from finite duration signals, Non-parametric method of power spectrum estimations.

The Bartleff method and the Blackman and Tukey method.

Selected portion from chapter 12 of Text book - 1: 12.1,12.1.1,12.1.2,12.1.3,12.2.1, 12.2.3.

Selected portion from chapter 12 of Text book – 2

Implementation of Discrete Time System structure of FIR systems – Direct form, cascaded form.

Structure IIR Systems - Direct form I & II realizations

Selected portions from chapter 7 (7.2, 7.2.1, 7.2.2, 7.3, 7.3.1) of Text book –I

Selected portions from chapter 9 of Text book – 2.

Text Books

1. Digital Signal Processing – Principles, Algorithms and Applications by J. G. Proakis and D. G. Manolakis, 3rd Edition, Pearson.
2. Digital Signal Processing by S. Salivahanan, TMH

Reference Book :

Introduction of Digital Signal Processing – J. R. Johnson, PHI.

CPEE 5306 POWER ELECTRONICS (3-0-0)

Module – I (12 hours)

Power Semiconductor Devices: Power diodes, Power Transistors and Thyristors, Static V-I Characteristics of SCR, TRIAC, GTO & IGBT, Turn-On & Turn-OFF Mechanism of SCR, its gate characteristics , Device Specification and rating , series and parallel operation, thyristor protection circuits, design of snubber circuit.

Triggering Circuits:

Types of triggering schemes : DC, AC & pulsed triggering, UJT triggering scheme, R-C triggering scheme, cosine – law triggering scheme.
Commutation.
Principle of natural commutation and forced commutation, circuits for forced commutation (Resonant commutation, voltage commutation, current commutation, load commutation).

Module – II (10 hours)

Control Rectifiers (AC to DC Converter)
Single Phase- Circuit Configuration and Principle of operation of operation of half wave, full wave controlled rectifiers (full converters and semi converters) wave form of voltage and current at the output and across the thyristor for R-L & R-L-E load, effect of source inductance, importance pf free wheeling diode for inductive loads. Input power facter for R& R-L load, Ripple factor. Average output voltage and currents.

Three Phase Controlled Rectifiers :
Half wave and full wave full controlled bridge rectifiers. Three phase semi-converters, average output voltage and current for R & R-L load.

Module – III (10 hours)
Inverters (DC to AC Converters):
Single Phase – Series inverters :Circuit description and principle of operation for simple and improved circuit. Parallel inverter : Basic circuit description and principle of operation without and with feed back diodes.
Bridge Inverters:
Principle of operation of modified Mc Murray & Mc Murray Bedford inverters . Concept of voltage source inverter & current- source inverter.
Three Phase : Concept of three phase bridge inverters, principle of operation (180° conduction mode & 120° conduction mode), wave form of output voltage and current for R & RL load.

Module IV (10 hours)

DC Choppers:
Basic Principles of class A, B, C, D, E Choppers, voltage commuted chopper, current commutated chopper and load commutated chopper.
Jones Chopper & Morgan Chopper .

Cyclo Converter (Single Phase) :
Basic Principle of Single phase Mid Point Cyclo Converters and bridge types cyclo converters.

Application:
Over voltage protection, zero voltage switch, integral cycle triggering (or Burst Firing), Uninterruptible power supply (UPS), Arc welding, HVDC transmission.

Text Book:

1. Power Electronics – Singh & Khanchandani TMH
2. Power Electronics – P. S. Bhimbra

Reference Book :

1. Power Electronics – P. C. Sen TMH.

CPEC 5303 ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS (3-0-0)

Module- I (14 hours)

Basics of Measurements. Accuracy, Precision, resolution, reliability, repeatability, validity. Errors and their analysis. Standards of measurement.

Bridge Measurement : DC bridges – wheatstone bridge. AC bridges – Kelvin, Hay, Maxwell, Schering and Wien bridges. Wagner ground Connection.

Electronic Instruments for Measuring Basic Parameters: Amplified DC meter, AC Voltmeter, True – rms responding Voltmeter, Electronics multimeter. Digital voltmeter. Vector Voltmeter.

Module – II (15 hours)

Oscilloscopes: Cathode Ray Tube, Vertical and Horizontal Deflection System, Delaylines, Probes and Transducers. Specification of an Oscilloscope. Oscilloscope Techniques. Special Oscilloscopes - Storage Oscilloscope. Sampling Oscilloscope.

Signal Generators: Sine wave generator, Frequency –Synthesized Signal Generator, Sweep frequency Generator. Pulse and squarewave generators. Function Generators.

Module - III (11 hours)

Signal Analysis : Wave Analyzer , Spectrum Analyzer .

Frequency Counters : Simple Frequency Counter ; Measurement errors; extending frequency range of counters.

Transducers : Types, Strain Gages, Displacement Transducers.

Module- IV (6 hours)

Digital Data Acquisition System : Interfacing transducers to Electronics Control and Measuring System. Instrumentation Amplifier. Isolation Amplifier.

An Introduction to Computer-Controlled Test Systems. IEEE- 488 GPIB Bus.

Text Books:

1. Modern Electronics Instrumentation & Measurement Techniques , by Albert D. Helstrick and William D. Cooper. Pearson Education.
   Selected portion from Ch. 1, 5- 13.

2. Elements of Electronics Instrumentation and Measurement – 3rd Edition by Joshph J. Carr. Pearson Education . Selected portion from Ch. 1,2, 4, 7, 8, 9, 13, 14, 18, 23 and 25.

Additional Reading :

1. Electronics Instruments and Instrumentation Technology – by Anand , PHI

CPEE 5307 ELECTROMAGNETIC THEORY (3-1-0)

Module I (12 hours)

The Co-ordinate Systems; Rectangular, Cylindrical, and Spherical Co-ordinate System. Co-ordinate transformation. Gradient of a Scalar field, Divergence of a Vector field and Curl of a Vector field. Their Physical interpretation. The Laplacian. Divergence Theorem, Stokes' Theorem. Useful Vector identifies .

Electrostatics :

The experimental law of Coulomb, Electric field intensity. Field due to a line charge, Sheet Charge and Continuous Volume Charge distribution. Electric Flux and Flux Density; Gauss's law. Application of Gauss's law. Energy and Potential . The Potential Gradient. The Electric dipole. The Equipotential surfaces. Energy stored in an electrostatic field. Boundary Conditions. Capacitors and Capacitances. Poisson's and Laplace's equations. Solutions of Simple Boundary value problems. Method of Images.

Module - II (11 hours)

Steady Electric Currents: Current densities , Resistance of a Conductor; The Equation of Continuity . Joules law. Boundary Conditions for Current densities. The EMF.

Magnetostatics:

The Biot-Savart law. Amperes' Force Law . Torque exerted on a current carrying loop by a magnetic field. Gauss's law for magnetic fields. Magnetic Vector Potential . Magnetic Field Intensity and Ampere's Circuital law. Boundary conditions. Magnetic Materials . Energy in magnetic field . Magnetic circuits. Application to cathode Ray Oscilloscope.

Module – III (11 hours)

Faraday's Law of Induction; Self and Mutual inductance . Maxwell's Equations from Ampere's and Gauss's Laws. Maxwell's Equations in Differential and Integral forms; Equation of Continuity. Concept of Displacement Current. Electromagnetic Boundary Conditions.

Poynting's Theorem , Time – Harmonic EM Fields . Application to Transformer.

Plane wave Propagation :

Helmholtz wave Equation. Plane wave solution. Plane wave propagation in lossless and lossy dielectric medium and conducting medium . Plane wave in good conductor, surface resistance , depth of penetration. Polarization of EM wave - Linear, Circular and Elliptical polarization. Normal and Oblique incidence of linearly Polarized wave at the plane boundary of a perfect conductor, Dielectric – Dielectric Interface . Reflection and Transmission Co-efficient for parallel and perpendicular polarizations , Brewstr angle.

Module - IV (10 hours)

Antennas :

Physical Concept of radiation from an antenna. Wave equations in terms of Potential Functions. The Concept of retarded Vector Potential . Hertzian Dipole: Near Zone Fields, Radiation Fields, Radiation resistance, Directive gain and Directivity. A Magnetic Dipole. A Short dipole Antenna. The Half wave Dipole Antenna. Monopole Antenna. Pattern Multiplication Antenna Arrays, Linear Arrays. Receiving Antennas.

Text Books :

1. Electromagnetic Field Theory, Fundamental by B. S. Guru & Huseyn R. Hiziroglu. Publication : Thomson Asia Pte. Ltd. Singapore. Vikas Publishing Home Pvt. Ltd. New Delhi.

2. Electromagnetic waves and Radiating Systems E. C. Jordan & K. G. Balmin, 2nd Edition. PHI Pvt. Ltd.

Additional Reading :

1. Elements of Electromagnetic by Mathew N. O. Sadiku, Publisher Oxford University Press.

Fields and Wave Electromagnetics, By David K. Cheng, 2nd Edition , Publisher : Pearson Education.

PRACTICALS

CPEC 9301 ANALOG COMMUNICATION LABORATORY (0-0-3)

(Experiments under slno. 1-5 are compulsory; 6-8 are optional)

1. Amplitude Modulation

i) Generation of DSB-C with sinusoidal modulating wave, Recording of Modulated waveform with various values of m. Measurement of power in sidebands.

ii) Generation of DSB-C. Costa's PLL for carrier recovery.

iii) Generation of SSB. Generation of VSB signal.

(9 hours)

2. Frequency Modulation

i) Generation of Narrow FM using Balanced Modulator.

ii) Direct method of generating wideband FM signal .

iii) Study of Pre emphasis & De-emphasis in FM.

(9 hours)

3. Detector circuits

i) Envelope Detector

ii) Product Detector

iii) FM Discriminator or Balanced Discrimination .

(6 hours)

4. Design and study of Low Pass, high pass, Bandpass and Band reject filters (both active and passive - Buffer worth type) .

(9 hours)

5.

i) Sampling and Quantization of Sinusoidal signal. Linearity characteristics and Frequency response .

ii) Signal Reconstruction.

(6 hours)

6. Generation of PCM signal .

(3 hours)

7. Generation of Gaussian Noise (Simulation by MAT Lab.) study on PSD of noise.

(3 hours)

8. Study on SNR of AM, FM and PCM by MAT LAB. Simulation.

(9 hours)

CPEE 9305 POWER ELECTRONICS LAB. (0-0-3)

(Any 10 experiments must be done)

1. V-I characteristics of SCR.
2. Different methods of triggering of SCR.
   a) Phase controlled method.
   b) UJT Triggering method.
   c) Cosine controller triggering method.
3. Study of triac and full wave voltage control method of it.
4. 1 phase half wave and full wave full controlled converter with R, R-L and D. C motor load with / without freewheel diode. .
5. 3- Phase half and full wave full controlled converter with R, R-L and D.C motor load with/without freewheeling diodes.
6. Study of characteristics curves of a 3 phase diode bridge.
7. Study of DC chopper with PWM controller
8. Study of SCR commutation
   a) Forced Commutation
   b) Load Commutation
9. Study of single phase series inverter.
10. Three phases IGBT based four quadrant chopper drive for D. C. motor.
11. Three phase IGBT based four quadrant chopper drive for induction motor.
12. Study of 1 phase cyclo converter

CPEC 9302 DIGITAL SIGNAL PROCESSING LAB. (0-0-3)

(All 10 experiments should be done, experiment 1-8 are must)

1. Different types of Signal generation using Matlab. (both continuous and discrete.)
2. Linear Convolution of sequences. (Without using the inbuilt function (conv) available in Matlab.)
3. Circular Convolution of two Sequences Comparission of result with the result obtained from Linear convolution.
4. i) Finding Auto correlation of a sequence
   ii) Finding cross correlation of 2 sequences .
   iii) Finding power spectral density of a sequence .
5. Finding the convolution of periodic sequence using DFT and IDFT.
6. Implementation of FFT (Fast Fourier Transform) algorithm
   i) Decimation in Tane (DIT)
   ii) Decemation in Frequency (DIF)
7. Design of FIR filter (lowpass, highpass,bandpass). Using windowing technique (harming window, haming, window rectangular window, Kaiser window.
8. Design of IIR filter. (Design of Butterworth Filter Design of Chebyshev filter)
9. Convolution of long duration sequences using overlap add, overlab save meter.
10. Working with a DSP processor. (fixed point -TMS320C-5X / Floating point) series.
    i) Implement convolution (Linear & circular convolution)
    ii) FIR & IIR implementation .

Lab. Reference :

Digital Signal Processing a hands –on approach by Schucer C, Mohesh Chgave. (TMH)

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)

5. Forecasting : Principles and Method, Moving Average, Double Moving Average, Exponential Smoothing, Double Exponential Smoothing, Winter's Method for Searonal 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.

CPEC 5304 DIGITAL COMMUNICATION TECHNIQUES (3-1-0)

Module - I (12 hours)

Sampling Theorem, Signal Reconstruction, Practical Difficulties . The Treachery of Aliasing, The Antialiasing Filter; Discrete Fourier Transform , Application of Sampling Theorem: PAM, PWM and PPM Signals.

Pulse Code Modulation : Qnantization of Signals, Qnantization error. Non-uniform Qnantization. The Compander. The encoder, Transmission Bandwidth and output SNR. A TI Carrier System : Synchronizing and Signaling. Differential PCM. Delta Modulation. Adaptive Delta Modulation, Output SNR. Comparision with PCM.

Module – II (12 hours)

Digital Modulation Techniques :
Generation, Transmission, Reception, Spectrum and Geometrical Representation in the Signal Space of BPSK, DPSK, Differentially-Encoded PSK, QPSK, $\pi/4$ QPSK, M-ary PSK, BFSK, M-ary FSK, and Minimum Shifting Keying (MSK).

Noise in PCM and DM :
Calculation of Quantization Noise Power, Output Signal Power , and the Thermal Noise Power. Output SNR of PCM using different modulation techniques. Output SNR of DM .

Module – III (14 hours)

Principles of Digital Data Transmission :
A Digital Communication System. Line Coding-Various line Codes. Polar Signaling ON-OFF. Signaling, Bipolar Signaling. Pulse Shaping: Nyquist Criterion for zero ISI. Scrambling. Regenerative Repeater – Preamplifier, Equalizer. Eye diagram. Timing Extraction, Timing Jitter . A Baseband Signal Receiver. Peak Signal to RMS Noise output voltage Ratio, Probability of Error . The Optimum Filter. White Noise : The Matched Filter- Probability of Error of the Matched Filter Co-herent Reception . Application to Phase Shift keying quadrature Phase PSK (QPSK). Use of Signal Space to calculate pe. Error Probability calculation for BPSK and BFSK .

Module – IV. (10 hours)

The Concept of amount of Information, Average Information, Entropy; Shanon-Fano Algorithm. Shanon's Theoerm – Channel Capacity, Bandwidth - S/ N Trade off. Use of Orthogonal Signals to attain Shannon's limit. Efficiency of orthogonal Signal transmission.
Coding : Parity Checkbit Coding for error Detection , Hamming distance . Upper Bounds of probability of error with coding. Block codes - Coding and Decoding Algebraic Codes: Hadamard Code, Hamming Code, Convolutional Coding : Code generation. Decoding of Convolutional Codes.

Text Books :

1. Principles of Communication Systems by Taub & Schilling, 2nd Edition. Tata Mc Graw Hill. Selected portion from Chapter 1, 3, 4, 7, 8, 9 and 10 .
2. Communication Systems by Siman Haykin, 4th Edition, John Wiley & Sons, Inc.
3. Digital and Analogue Communication System, Leon W. Couch-II, 6th Edition, Pearson

Additional Reading :

1. Modern Digital and Analogue Communication Systems by B.P. Lathi, 3rd Edition, Oxford University Press. Selected Portion from Ch. 2,3,4,5 and 12.

2. Communication System, Analogue and Digital, R.P. Singh & S.D. Sapre, TMH

CPEC 5305 MICROPROCESSOR & MICRO CONTROLLER (3-1-0)

MODULE - I (12 hours)

Microprocessor Architecture:- Introduction to Microprocessor and Microcomputer Architecture, Pins & Signals, Register Organization, Timing & Control Module, 8085 Instruction Timing & Execution.

Instruction Set and Assembly Language Programming of 8085:- Instruction set of 8085, Memory & I/O Addressing, Assembly language programming using 8085 Instruction Set, use of Stack & Subroutines.

Memory Interfacing:- Interfacing EPROM & RAM Memories: 2764 & 6264,

Interrupts :- 8085 Interrupts

MODULE – II (12 hours)

Microprocessor Based System Development Aids:- Programmable Peripheral Interface: 8255, Programmable DMA Controller: 8257, Programmable Interrupt Controller: 8259

Microcontroller (Architecture and Programming):- Introduction to 8051 Microcontrollers (Architecture, Pin description), 8051 Assembly Language Programming (JUMP, LOOP, CALL Instructions), I/O Port Programming, 8051 Addressing Modes, Arithmetic & Logic Instructions

MODULE – III (12 hours)

Microcontroller Interrupts and Interfacing to 8255:- 8051 Interrupts, Interfacing to 8255,Intel 8086 (16 bit processors):- 8086 Architecture, Addressing Modes, Instruction Format, Pins & Signals, 8086 Basic System Concept, Interfacing with Memories, 8086 Interrupts.

MODULE – IV (11 Classes)

Intel 80386 :- Introduction to 80386 Microprocessor, Architecture, Pins & Signals, Memory System, Registers, 80386 Memory Management, Paging Technique, Protected Mode Operation, brief introduction to 80387 Math Coprocessor.

Pentium Processors (Only features):- Introduction to Pentium Processors, Memory System, Input/Output System, Branch Prediction Logic, Floating Point Module, Cache Structure, Superscalar Architecture.

(only the features of Pentium Processor mentioned above are to be discussed)

TEXT BOOKS :

1. 0000 to 8085 – Introduction to Microprocessor for Scientists & Engineers by Ghosh & Sridhar, PHI publication (for Module I to Module – III)
2. Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A.K. Roy & K.M. Bhurchandi – TMH Publication (For Module-V to Module- VII)

3. The 8051 Microcontroller & Embedded Systems by Mazidi & Mazidi – Pearson / PHI publication (For Module-IV)
4. Microcontrollers [theory and applications] TMH publication by Ajay V. Deshmukh. (Chapter – 2 to Chapter – 6)
5. Microprocessors and programmed logic (2nd Edition), Pearson Education by Kenneth L. Short

REFERENCE:

1. Microprocessor architecture, programming & application with 8085 by R.S. Gaonkar.
2. Microprocessor – Theory & Applications. (Intel & Motorola) by M. Rafiqzzaman.
3. The Intel Microprocessor – (Architecture, Programming & Interfacing) by Barry B. Brey.

CPEE 5302 CONTROL SYSTEM ENGINEERING (3-0-0)

MODULE - I (10 hours)

Introduction:

Basic concepts of control systems, Open loop and closed loop systems, difference between open loop and closed loop systems, classifications

Mathematical model of physical systems, transfer function, block diagram algebra, signal flow graph (SFG), Mason's gain formula, application of SFG to control systems

Feed back theory,: Types of feedbacks, effect of degenerative feedback on control system, regenerative feedback.

Components: A.C. Servo motor, DC servo motor, AC tacho meter, synchros, amplidyne, stepper motor

MODULE – II (10 hours)

Time domain analysis: Standard test signals: Step, ramp, parabolic and impulse signals. Time response of 1&1 order systems to unit step and unit ramp inputs. Time response of second order systems to unit step input. Time response specifications. Steady sta_e errors and error constants of different types of control systems Generalised error series method

Concepts of stability: Necessary conditions of stability, Hurwitz stability criterion, routh stability criterion, application of routh stability criterion to linear feed back systems, relative stability

Root locus techniques: Root locus concepts, rules for construction of root loci, determination of roots from root locus, root contours. systems with transportation lag

MODULE – III (10 hours)

Frequency domain analysis: Introduction, Bode plots, determination of stability from Bode plots, polar plots, nyquist stability criterion, application of nyquist stability criterion to linear feed back systems

Closed loop frequency response: Constant M circles, constant N circles, use of Nicolas chart

Controllers: Introduction, Propo_ional, derivative and integral control actions, PO, PI and PID controllers and their applications to feed back control systems, Zeigler- Nichols method of tuning PID controllers for known dynamic model of the plant.

MODULE – IV (10 hours)

State variable analysis: Introduction, concept of state variables, state vector, input and output vector, general state model representation of linear time invariant, SISO and MIMO systems and their block diagram representations, state model representations of physical systems

Digital Control System: Introduction to digital control system, Shanon's sampling theorem, signal reconstruction, transfer function of ZOH, the z-transforms of various functions, inverse z transform, properties of z-transform, soluti()n of difference equations, the pulse-transfer function of linear feedback systems.

Introduction to MAT Lab.

Text Books:

1. Control Systems Engineering by LJ. Nagrath, M. Gopal, Third Edition, New Age International Publishers.
2. Modem Control Engineering by K. Ogata, PHI
3. Modem Control Engineering by D. Roy Choudhury, PHI

Reference Books:

1. System Dynamics and Control: Eroni Umez Erani, PWS Publishing, International Thompson Publishing Company
2. CQntrol System, Theory & Applications by Sama_it Ghosh, Pearson Education

CPEC 5306 ADVANCED ELECTRONICS CIRCUITS (3-0-0)

Module – I (10 hours)

Active Filters :

First & Second order low pass / high pass, band pass, band reject, and all pass filters. Universal active filter design. Wien Bridge oscillator, Sawtooth wave generator OP Amps. Voltage Controlled Oscillator.

Module – II (10 hours)

Bistable Multivibrator : Stable States, Fixed Biased and Self-biased Transistor binary, Commutating capacitors, Symmetrical / Unsymmetrical triggering, Schmitt trigger Circuit. Cathodecoupled Binary, Emitter coupled Binary .

The Monostable Multivibrator: Gatewidth Collector coupled, wave forms triggering. Emitter- coupled Monostable Multi.

Astable – Multivibrator : Emitter coupled, Collector coupled , Wave forms.

Module – III (12 hours)

Wideband amplifiers and Negative resistance devices :

Frequency response; Transient response of transistor stage, shunt compensation of a transistor stage in cascade, Other methods of compensation. Rise time of cascaded compensated stages, low frequency compensation.

Negative Resistance Switching Circuits:

Tunnel Diode operation and characteristics, Monostable Astable, Bistable circuits using tunnel diode , Voltage controllered Negative Resistance Switching Circuits.

UJT operation and characteristics . Application of UJT to generate Sawtooth waveform .

Module - IV (10 hours)

Analysis & Design of : Voltage time base generator. Current time base generator

Instrumentation Amplifier , IC 555 Timer , Phase Locked Loop.

Text Book:

1. Pulse , Digital and switching Waveforms - Jacob Millman and Herbert, Taub (TMH Publication). (selected portion from Chapter 4,5,1011, 12, 13,14, and15)
2. OP-Amps and Linear Integrated Circuits – Ramakant A. Gayakwad (PHI Publication).
3. Pulse and Degital Circuits by A. Anand Kumar, PHI

Supplementary Books:

1. OP-Amps and Linear Integrated Circuits – Robert F. Coughlin, Frederick F. Driscoll (Pearson Education Publication).

CPEC 5307 MICROWAVE ENGINEERING (3-1-0)

Module - I (12 hours)

High Frequency Transmission lines and Wave guides :

The Lumped –Element Circuit model for a Transmission line. Wave propagation. The lossless line. Field Analysis of Co-ax Transmission Lines. R, L. C. G parameters of Co-ax & Two wire Transmission Lines. Terminated lossless transmission line. Transmission line as circuit element. The Smith Chart. Solution of Transmission line problems using Smith Chart. Single Stub and Double Stub matching. Lowloss line.

Waveguides :

Rectangular waveguide, Field solution for TE and TM modes, Field patterns power flow through waveguide. Attenuation due to conductor and dielectric losses. Design of Rectangular waveguide to support Dominant TE10 only .

Module - II (10 hours)

TEM mode in Co-ax line. Cylindrical waveguide - Dominant Mode. Design of Cylindrical Waveguide to support Dominant TE11 mode.

Microwave Resonator :

Rectangular Waveguide Cavities. Resonant frequencies and of Cavity Supporting . Dominant mode only. Excitation of waveguide and Resonators (in princle only)

Waveguide Components:

Power Dividers and Directional Couplers : Basic Properties. The T-Junction Power Divider. Waveguide Directional Couplers.

Fixed and Precision Variable Attenuator . Ferrite , Fermle Isolator .

Principle of Operationing .

Module – III (10 hours)

Microwave Sources :

Reflex Klystron: Velocity Modulation. Electronic Admittance. Power Output and Frequency vrs Reflector Voltage . Squarewave modulation.

Multicavity Magnetron : Principle of Operation, Rotating Field. II-Mode of Operation , Frequency of Oscillation. The Ordinary type (O-Type) Traveling wave Tube - Constructional features, Principle of Operation as an amplifier .

Gunn Oscillator Principle and performance Simple Analysis Electron – field interaction.

Mixer : Linear Mixer Operation.

Module – IV

(10 hours)

Microwave Antennas:

Horn Antennas : E-And H- Plane Horns. Radiation Patterns. Pyramidal Horn. Gain of Horn Antenna.

Paraboloid Reflector Antenna – Simple Analysis , Radiation Pattern in principal Planes. Gain and Bandwidth of Reflector Antenna.

Microwave Propagation :

Line of sight propagation. Attenuation of Microwaves by Atmospheric gases, Water Vapour & Precipitates .

Microwave Measurement : Measurement of Admittance . Measurement of Gain of a Horn Antenna.

Text Books :

1. Microwave Engineering by D. M. Pozor , 2nd Edition. John Willy & Sons. Selected portions from Chapter 2, 3, 4, 6, 7 & 9.
2. Principles of Microwave Engineering By Reich, Oudong and Others.
3. Microwave Device and Circuit, 3rd Edition, Sammuel Y., Liao, Perason

PRACTICALS

CPEC 9303 DIGITAL COMMUNICATION LABORATORY (0-0-3)

(Experiments under slno. 1-8 are mandatory ; 9 and 10 should be attempted)

1. AD and DA converters - Linearity .
   (6 hours)
2. 2 Level to N- level converter .
   (3 hours)
3. Delta Modulator and Adaptive Delta Modulator .
   (6 hours)
4. Generation of PSK , DPSK and QPSK Signal.
   (6 hours)
5. Generation of FSK and MSK Signal.
   (6 hours)
6. Generation of ASK and Q-AM Signals .
   (6 hours)
7. QPSK Demodulators .
   (3 hours)
8. Design of a PN sequence Generator.
   (hours)
9. TDM (MAT LAB Simulation)
   (6 hours)
10. Performance of any digital mod/demod Scheme in the presence if noise (MAT LAB Simulation).
    (6 hours)

CPEC 9304 MICROPROCESSOR & MICROCONTROLLER LAB. (0-0-3)

A) 8085

1. Addition, Subtraction, Multiplication, Division of two 8 bit numbers resulting 8/16 bit numbers.
   (6 hours)
2. Smallest /Largest number among n number in a given data array + Binary to Gray Code / Hexadecimal to decimal conversion.
   (3 hours)

B) INTERFACING

(15 hours)

COMPULSORY

3. Generate square waves on all lines of 8255 with different frequencies (concept of delay program) 1 lecturer)
4. Study of stepper Motor and its operations (Clockwise, anticlockwise, angular movement, rotate in various speeds) 1 lecturer)

OPTIONAL (Any Two)

(3 hours)

5. Study of Traffic Light controller

6. Study of Elevator Simulator
7. Generation of Square , triangular and saw tooth wave using Digital to Analog Converter
8. Study of 8253 and its operation (Mode 0, Mode 2, Mode 3)
9. Study of Mode 0, Mode 1, BSR Mode operation of 8255.
10. Study of 8279 (keyboard & Display interface)
11. Study of 8259 Programmable Interrupt controller.

C) 8051MICROCONTROLLER

(9hours)

COMPULSORY

12. Initialize data to registers and memory using immediate, register , direct and indirect addressing mode

(6 hours)

OPTIONAL (any one) (3 hours)

13. Addition, subtraction of 16 bit numbers.
14. Multiplication, Division of 16 bit numbers
15. Transfer a block of data to another memory location using indexing.
16. Operation of 8255 using 8051 microcontroller

D) 8086 (6 hours)

COMPULSORY

17. Addition, subtraction, Multiplication , Division of 16 bit nos + 2's complement of a 16 bit no.

(3 hours)

OPTIONAL (Any One)

18. Finding a particular data element in a given data array. (3 hrs)
19. Marking of specific bit of a number using look-up table.
20. Largest /Smallest number of a given data array.
21. To separate the Odd and Even numbers from a given data array.
22. Sorting an array of numbers in ascending/descending order

Total – 13 x 3 hrs

NOTE Total 10 (Ten) experiments have to be completed .

Two from GP-A , four from Gp- B, Two from Gp – C Two from Gp – D.

CPEC 9305 DESIGN & SIMULATION LABORATORY (0-0-3)

(All are compulsory)

(use of circuit simulation s/w (P. spice, or cad circuit maker T. space,)

1. Multivibrator design (simulation using transistors). (3 hrs)
2. Amplifier Design (2 stage, 3 stage) obtain Frequency Response. (3 hrs)

3. Given the message signal , Carrier signal simulate a DSB – AM system

   i) Obtain the modulated waveform

   ii) Calculate power.

   iii) Add noise to the modulated signal (Ganssian or white) (SNR), so as to achieve a particular SNR and find out noise power.

(3 hrs)

4. Simulate the constant Envelope PSK Signal, Waveform for different values of M. M= 2,4,8.

(3 hrs)

5. Phase locked loop design.

(3 hrs)

6 . Design a Huffman code for a source with given :

   i) Length and Corresponding Probabilities

   ii) Determine the entropy of source

(6 hrs)

7. Generation of a sinusoidal signal of given amplitude & frequency. Using uniform PCM scheme

   iii) Quantize it once to 8 levels

   iv) Quantize it once to 16 levels

   Plot the original signal and the quantizied signals on the same axes. Compare the resulting SQNRs in the two cases.

8. Simulation to estimate the probability of error for the binary communication system plot Pe ~ SNR for a binary communication system employing matched fitter.

(9 hrs)

9. Design and Simulate a Gaussian Noise Generator.

(3 hrs)

10. Design a PCM system to a given specifications and study its performance by simulation using MAT lab.

(9 hrs)

COURSE STRUCTURE
FOURTH YEAR B.TECH PROGRAMME
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

7th Semester	8th Semester

Theory		*Contact Hrs.*	*Credit*
		L-T-P	
HSSM 4403	Environmental Engineering	3-0-0	3
CPEC 5401	Communication Systems	3-1-0	4
CPEC 5402	Digital Image & Speech Processing	3-1-0	4
CPEC 5403	VLSI Design	3-0-0	3
	Electives (Any one)	3-0-0	3
BCSE 3306	Computer Networks		
BCSE 3310	Computer System Architecture		
CPEE 5305	Advanced Control System Engg.		
PEEC 5401	Antenna Engineering		
	Electives (Any one)	3-0-0	3
PEEC 5402	Adaptive Signal Processing		
BCSE 3401	Computer Graphics & Multimedia		
BCSE 3305	Operating Systems		
PECS 3401	Soft Computing		
	Total		**20**

Practicals/Sessionals		*Contact Hrs.*	*Credit*
CPEC 9401	Project		3
CPEC 9402	Comm. System Lab	0-0-3	2
CPEC 9403	VLSI Lab.	0-0-3	2
CPEC 9404	Seminar		1
			8
	Total		**28**

Theory		*Contact Hrs.*	*Credit*
		L-T-P	
HSSM 4404	Marketing Management	3-0-0	3
CPEC 5404	Mobile Communication	3-1-0	4
	Electives (Any one)	3-0-0	3
PEEC 5403	Internet Security & Prof.Ethics		
PEEC 5404	Core JAVA		
PEBM 8401	Biomedical Inst. & Measurement		
PEEC 5406	Radar & T.V. Engineering		
	Electives (Any one)	3-0-0	3
PEEC 5407	E-Commerce		
PEEC 5408	Advanced Java (J2EE)		
PEEC 5409	Mobile Computing		
PEEC 5410	Information System & Design		
PEEC 5411	Advanced Communication System		
BCSE 3402	Software Engineering		
	Total		**13**

Practicals/Sessionals		*Contact Hrs.*	*Credit*
CPEC 9405	Project		7
CPEC 9406	Seminar		1
CPEC 9407	Entrepreneurship Project	0-0-3	2
CPEC 9408	Comp. Viva Voce		2
			12
	Total		**25**

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.

CPEC 5401 COMMUNICATION SYSTEMS (3-1-0)

I. Optical Communication System :

Module – I (12 hours)

Major Elements of an optical fiber communication link. Optical fiber attenuation as a function of wavelength.

Optical fiber: Refractive index profile of step Index and Graded Index Fibers. light ray propagation through Optical fiber. Total Internal Reflection. Numerical Aperture, Modal Concept. V number. Electro magnetic Theory of wave Propagation through step index fiber Mode Theory for Circular waveguide. Wave Equator Step Index fiber. Modes in step index fiber. Power flow in step index fiber. Graded index fiber structure. Monomode fiber

Fiber Materials: Fiber Fabrication : Double –Crucible Method. Cabling of Optical Fibers.

Signal Degradation in Optical Fiber:
Attenuation: Factors contributing to losses. Signal Distortion – Inter-and Intra Modal, Chromatic, Wave guide and Polarization Dispersions. Pulse Broadening in SI & GI fibers. Km - Bandwidth Concept.

Module – II (15 hours)

Optical Sources :

LED, Typical GaAlAs p-n junction double hetrostructure, Typical Spectral pattern, Modulation of an LED. Laser diodes: Principle of Operation. Typical Constructional features Radiation Pattern. Modulation of Laser diode , Typical Manufactures' specifications of LED & LASER. Power Lunching & Coupling : Source to fiber power launching , Coupling Power Calculation. Lensing Scheme for

improvement of coupling. Fiber-to-fiber Connectors Connector loss. Techniques of Splicing . Splicing loss, .

Photo Detectors :
p-n , PIN and APD Photodetectors, Responsivity and Bandwidth of diodes. Noise in PDs. Equivalent Circuits. SNR.

Optical Receiver :
Receiver Configuration Sensitivity and Bandwidth of Receiver Bit Error Rate. Trans Impendance Preamplifier.

Design of Fiber Optic link : Time Budget and Power Budget . Optical Amplifier. WDM : Principle & Practice.

II. Satellite Communication Systems:

Module - III (14 hours)

Orbital Mechanics: Determination of Orbinal Parameters, look angle of a geostationary Satellite from Earth. Launches and Launch Vehicle. Placing Satellite into Geo-stationary Orbit.

Satellite Subsystems : A brief Description of AOCS, TTC & M and Power System. Description of Communication System – Transponders.
Satellite Antennas: Basic Antennas Types and Relationship; Global Beam Antenna, Satellite Antennas in Practice. Equipment Reliability & Space qualification. Redundancy.

Satellite Link Design :
Basic Transmission Theory , System Noise Temperature and G/T Ratio; G/T Ratio for Earth Station. Design of Down Link. Up link Design. Satellite Communication Link Design Procedure. System Design Example – Ku Band

Module - IV (12 hours)

Multiple Access : Comprehensive study on FDMA, TDMA and CDMA. Spread Spectrum Transmission and Reception.

Propagation Effects and Their Impactor Satellite: Earth Links: Attenuation, Depolarization, Ionospheric & Troposhric effects. Prediction of Rain Attenuation. Propagation Impairement Countermeasures.

Typical features of Vsat and Direct Broadcast Satellite TV & Radio System.

Text Books :

1. Optical Fiber Communications by G. Keiser. 3rd Edition Mc Graw Hill Book Co.
2. Fiber Optic Communications Technology by D. K. Mynbaev & Lowell L. Scheiner – Pearson Education.
3. Satellite Communication by T. Pratt, C. Bostian and J. Allnutt. 2nd Edition , Joihn Wiley Co. Selected Portion from Chapters 2,3,4,6,8,9 and 11.
4. Digital Communication with Satellite and Fiberoptic Application, Harlod Kolimbins, PHI

Additional Reading :

1. Optical fibers and Fiber Optic communication systems by Subir Kumar Sarkar , Publication : S. Chand & Co.
2. Fiber Optic communications By Joseph C. Palais 4th Edition , Pearson Publication Asia.
3. Satellite Communication by Robert M. Gagliardi, CBS Publishers
4. Advanced Electric Communication System by Wayne Tomani, 6th Edition , Pearson Education.

CPEC 5402 DIGITAL IMAGE & SPEECH PROCESSING (3-1-0)

Module – I (11 hours)

Digital Image

1. Different Stages of Image processing & Analysis Scheme. Components of Image Processing System, Multiprocessor Interconnections.
2. A Review of various Mathematical Transforms .
   Fuzzy Sets and properties; Mathematical Morphology, Wavelet Transform .
   Perception of colour .
3. Image Formation : Geometric Model, Photometric Model .
4. Image Digitization : A review of Sampling and quantization processes. A digital image.

Module – II (11 hours)
Image Processing

5. Image Enhancement : Contrast Intensification, Smoothing, Image sharpening.
6. Restoration : Minimum Mean – Square Error Restoration Restoration by Homomorphic Filtering
7. Image Compression : Schematic diagram of Data Compression Procedure, Lossless Compression – Coding.
   Registration : Geometric Transformation
9. Multivalued Image Processing
   Multispectral Image Processing , Processing of colour images

Module – III (13 hours)

Digital Speech Processing

1. The Fundamentals of Digital Speech processing.
   A Review of Discrete-Time Signal & Systems, the Z-transform, the DFT, Fundamental of Digital Filters, FIR system, IIR Systems,
2. Time – Domain Methods for Speech Processing.
   Time – Dependent Processing of speech, short-time energy and Average Magnitude, Short time Average Zero-Crossing Rate.

3. Digital Representation of speech Waveform.
   Sampling speech signals, Statistical Model, Instantaneous quantization, Instantaneous companding, Quantization for optimum SNR, Adaptive Quantization, Feed-Forward and Feedback adaptations.

Module – IV (8 hours)

Linear Predictive Coding of Speech.
Block diagram of Simplified Model for Speech Production. Basic Principles of Linear Predictive Analysis – The Auto Correlation Method. The Prediction Error Signal.

Digital Speech Processing for Man-Machine Communication by voice. Speaker Recognition Systems - Speaker Verification and speaker Identification Systems.

Text Books : (Digital Image Processing)

1. Digital Image Processing and Analysis by *B.Chanda & D.Dutt Majumdar, PHI, 2001. Selected Portions from Chapter 1-10.*
2. Fundamentals of Digital Image Processing by *Anil K. Jain,* Pentice Hall of India – 2002.
3. Digital Image Processing – 2nd Edition by Rafael C. Gonzalez and Richard E. Woods, Pearson Education

Additional Reading

1. Digital Image Processing using MAT LAB by R.C. Gonzalez, R.E. Woods and Steven L.Eddins, Pearson Education.

Text Books : (Digital Speech Processing)

1. Digital Processing of Speech Signals by L. R Rabinu and R. W Schafer , Pearson Education, Selected portions from Ch. 1,2,4,5,8 & 9.

Additional Reading

1. Fundamentals of Speech Recognition, by L. Rabiner and Biing- Hwang Juang Pearson Education.
2. Speech Communications, 2nd Edition, by Douglas O' Shaughessy, University Press.

CPEC 5403 VLSI 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.

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.

BCSE 3306 COMPUTER NETWORKS (3-0-0)

Module – I 10 hours

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

Module –II 12 hours

Data Link Layer

Error Detection and correction : Type 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 10 hours

Network Layer : Host to Host Delivery: Internetworking, addressing and Routing

Network Layer Protocols: ARP, IPVA, ICMP, IPV6 ad ICMPR6

Transport Layer : Process to Process Delivery : UDP; TCP congestion control and Quality of service.

Module –IV 8 hours

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 :

Data Communications and Networking : Third Edition. Behrouz A. Forouzan
Tata Mc Graw-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. Tannenbaum PHI.

BCSE 3310 COMPUTER SYSTEM ARCHITECTURE (3-0-0)

Module – I (06 hours)

Introduction: Brief history of computers, organization and architecture, basic organization of computers, system bus & interconnection, PCI, computer functions, I-cycle. Interrupt and class of

interrupts, Von-Neumann Machine: structure of IAS, computer components, fetch and execute cycles, example of program execution, instruction cycle state diagram, instruction pipelining.

Module – II (14 hours)

CPU Organization: Fundamental concepts, fetching and storing a word in memory, register transfer, performing an arithmetic and logic operation, execution of a complete instruction, general register organization: control word, examples of micro-operations, stack organization, RPN, evaluation of arithmetic expression using RPN , instruction format: three address, two address, one address and zero address instructions, addressing modes: types of addressing modes, numerical examples, data transfer and manipulation: data transfer, data manipulation, arithmetic, logical & bit manipulation instruction, program control: conditional branch instruction, subroutine, program interrupt, types of interrupt, RISC & CISC characteristics, control unit operation: hardware and micro-programmed control.

Module – III (08 hours)

Input/ Output Organization : Peripheral devices, input-output interface, I/O bus and interface module, asynchronous data transfer, strobe control, handshaking, asynchronous serial transfer, asynchronous communication interface, modes of transfer: programmed I/O, interrupt driven I/O, direct memory access (DMA), DMA controller, I/O channel & processor, priority interrupt: daisy chaining priority, parallel priority interrupt.

Module – IV (12 hours)

Memory Organization: Memory hierarchy, characteristic of memory system, semiconductor main memory types, organization, memory cell operation, cache memory: cache principle, elements of cache design, cache size, mapping function, replacement algorithm, LRU, FIFO, LFU, write policy, umber of caches: single versus two level caches, Pentium cache organization, associative memory: hardware organization, match logic, read operation, write operation auxiliary memory: magnetic disks, magnetic tapes, virtual memory: paging, address mapping using pages, segmentation, demand paging, memory management hardware.

Books:

1. William Stallings, “Computer Organization and Architecture”, Fourth Edition, PHI.
2. M. Morris Mano, “ Computer system Architecture”, Third Edition, PHI.
3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, MC Graw Hill Internatinal Edition.

CPEE 5305 ADVANCED CONTROL SYSTEM ENGINEERING (3-0-0)

Module – I (10 hours)

Mathematical modeling of dynamic systems in state space, state space representation of Mechanical and Electrical systems, State equations and transfer functions, Characteristics equation, Eigenvalues and Eigenvector of state matrix, Solution of time-invariant state equation, determination of State Transition Matrix, use of Cayley –Hamilton Theorem, Minimal, Polynomial, Sylverster’s interpolations, controllability, observability

Module – II (8 hours)

Introduction to design of control systems in state space, design of phase lead and phase lag controllers in time and frequency domain, pole placement design, State observers.

Module - III (14 hours)

Sampling and Signal reconstruction : definition and Evaluation of Z-Transform, properties of Z-Transform, Inverse Z-Transform, Mapping between S-plane and Z-plane, system descriptions by difference equations and solutions.

Sample data control systems : transfer function of discrete data systems, Pulse and Z-Transform functions, transfer function of discrete data systems with cascade elements, transfer functions of Zero order and 1st order holds, transfer function of closed loop discrete data systems, State equation of discrete data systems, solution of discrete state equations, discrete state transition equation, Z-Transform solutions of discrete equations, Transfer function matrix and the Characteristics equation, stability Tests of discrete state equations, Bilinear Transformation method, direct stability Tests.

Module – IV (10 hours)

Nonlinear systems : Common physical nonlinearities, the phase plane methods, Basic concepts, Singular points, stability on nonlinear systems, Construction of phase trajectories, Construction by analytical and graphical methods, System analysis by phase plane method, the describing function methods : Basic concepts, derivation of describing functions for common nonlinearities, stability analysis by Describing function approach, Jump resonance, Lyapunov stability criterion, Popov's stability criterion

Text Books

1. Modern Control Engineering, K. Ogata, PHI
2. Atomatic Control System, B.C. Kuo, PHI
3. Digital Control of Dynamic System, G. Franklin, J. D Powell, M. Workman, Pearson

PEEC 5401 ANTENNA ENGINEERING (3-0-0)

Module - I (11 hours)

Principles of Radiation , Retarded Vector Magnetic Potential. Radiation field from Current element. Radiation Resistance, Current Distribution, on a thin Wire. Half wave dipole and Quarterwave monopole.

Two-element array. Principle of Pattern Multiplication. Linear Array. Broadside and end fire patterns . Antenna Gain, effective length of an antenna. Input Impedance. Balun.

Module – II (12 hours)

Folded Dipole, Yagi Antenna. Frequency Independent Antenna. Log Periodic Dipole array.

Secondary Sources and Aperture Antennas . Magnetic Current. Principles of Images. The Equivalence Theorem. Radiation form Huygen's Sources. Radiation from openend of a Co-axial line. Aperture in an absorbing screen. .

Radiation through an aperture in a perfectly conducting screen. Babinet's Principle– Complementary Screen. A thin slot in an infinite Screen. Slot antenna on a rectangular wave guide wall.

Module – III (10 hours)

Horn Antennas – Pyramidal & Sectoral Horn. Radiation Pattern and Gain of horn antenna.

Parabolic Reflector Antenna - Principle, analysis, Radiation Pattern and Gain. Principles of Cassegrain Antenna.

Inducted EMF method of Calculating Input Impedance of wire antenna. Mutual Impedance between two dipoles.

Module- IV (09 hours)

Microstrip Antenna – Basic Characteristics, Rectangular Patch, Circular Patch, Microship Array Antenna.

Electronic Scanning Antenna- Phase Scanning, Frequency Scanning and Beam switching.

Antenna Measurements – Radiation Pattern, Gain and Input Impedance.

Text Books :

1. Electromagnetic Wave and Radiating Systems by E. C Jordan and K. G. Balmain, 2nd Edition , PHI. Ch. 10,11,12,13,14 and 15.

2. Antennas Theory - Analysis and Design By C Balamis, 2nd Edition, John Willey & Sons. Selected portion Ch. 11,12,13, 15 and 16.

Additional Reading :

1. Antenna Engineering by J. D. Krauss.
2. Antenna Engineering by W. L. Weeks
3. Antennas and Wave Propagation by G. S. N. Raju, Pearson Education.
4. Antenna & Wave Propagation by R.E. Collins.

PEEC 5402 ADAPTIVE SIGNAL PROCESSING (3-0-0)

ADAPTIVE SYSTEMS & APPLICATION:

Application of Adaptive filters to system identification, Adaptive channel equalization, Echo cancellation in Data Transmission, Adaptive Noise Cancellation. Adaptive Line Enhancement (ALE), LPC of speech signal, Adaptive Arrays.

ADAPTIVE ALGORITHMS :

The Widrow-Hoff Least Mean Square Algorithm, The RLS Algorithm, The fast RLS Algorithms, Transform domain LMS Algorithm, Power Normalization, Gradient Lattice- Ladder Algorithm.

ADAPTIVE FILTER STRUCTURES :

Tapped Delay Adaptive filter, Transform Domain Adaptive Filter, Block LMS Filters Algorithms and Structures, Adaptive Equalizer and DE-convolution, Adaptive Line Enhancement, Adaptive System Identification.

HIGHER ORDER SPECTRA

Properties, Application to Blind De-convolution, Channel Equalization and Image Processing.

Text Book :

1. Introduction to Digital Signal Processing - J. G. Proakais & D. G. Manolakis, Macmillan, Publishing Co., 1989. Chapters – 2,4,5,6,7, 8,9 & 11.
2. Adaptive Signal Processing by B. Widrow & S. D Stearns , Prentice hall, Inc. Englewood Cliffs; NJ, 1985 , Chapter 1,2,6,8,9,& 10.

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

Module –I (10 hours)

A survey of Computer Graphics Applications e.g.: CAD, Presentation Graphics, Art, Entertainment, Education and Training, Visualization, GUI.
Overview of Graphics Systems : Video display Devices, Raster-Scan and Random Scan Systems, Input Devices, Hard copy Devices, Graphics Software.
Output Primitives :- Points and Lines, Breshenham's line Algorithm, Midpoint Circle algorithm, Filled Area Primitives
Attributes of output primitives : Line, Curve, Area fill and character generation, Bundled attributes, antialiasing. Two Dimensional Geometric Transformation.

Module –II (10 hours)

Two Dimensional Viewing : the viewing Pipeline Viewing coordinate Reference frame, Window-to-view port coordinate Transformation.
Line Clipping (Cohen-Sutherland Algorithm) and polygon Clipping (Stherland-Hodgeman algorithm)
Three dimensional Object Representation : Polygon Surface, quadratic Surface, Spline Representation, Bezier Curves and Surfaces B-Spline Curves and surfaces.

Module –III (10 hours)

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 (Parallel and Prospective) Clipping

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 Rendering Methods : Polygon Rendering Methods, Gouraud and Phone Shading

Module –IV (10 hours)

Multimedia Systems : Medium, Main Properties of a Multimedia System, Sound & Audio, Image and Graphics, video and animation, Data compression : JPEG and MPEG,DVI Multimedia Applications, Future Directions.

Text Books :

1. Computer Graphics : D.Hearn and M.P. Baker (C version) PHI
2. Multimedia Computing Communications And Applications : Ralf Steinmetz And Klara Nahrstedt – Pearson Education .

Reference

1. Computer Graphics Principles & Practice , J.D Foley, A. Dam, S.K.Feiner – Addison Wesley

BCSE 3305 OPERATING SYSTEMS (3-0-0)

Module-I

Introduction: What I an Operating System.

Simple Batch System, 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, Cooperating 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, Trashing.

Module-III

File-system Interface: File concept, Access Methods, Allocation 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 LINMUX, WINDOW NT.

Text Book

1. 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 (13.1-13.5)

Reference Book:

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

PECS 3401 SOFT COMPUTING (3-0-0)

Module – I (06 hours)

Basic tools of soft Computing – Fuzzy logic, Neural Networks and Evolutionary Computing , Approximations of Multivariate functions, Non – linear Error surface and optimization.

Module – II (10 hours)

Fuzzy Logic Systems : Basics of fuzzy logic theory, Crisp and fuzzy sets. Basic set operations. Fuzzy relations, Composition of Fuzzy relations, Fuzzy inference, Zadeh's compositional rule of inference. Defuzzificaiton. Fuzzy logic control: Mamdani and Takagi and Sugeno architectures. Applications to pattern recognition.

Module – III (16 hours)

Neural networks : Single layer networks, Perceptron. Activation functions. Adalinc: its training and capabilities, weights learning, Multilayer perceptrons : error back propagation, generalized delta rule. Radial basis function networks and least square training algorithm, Kohenen self – organizing map and learning vector quantization networks. Recurrent neural networks, Simulated annealing neural networks. Adaptive neuro-fuzzy information ;systems (ANFIS), Applications to control and pattern recognition.

Module—IV (08 hours)

Evolutionary Computing : Genetic algorithms : Basic concepts, encoding , fitness function, reproduction. Differences of GA and traditional optimization methods. Basic genetic programming concepts Applications.

Text Books.:

1. V. Keeman, "Learning and Soft computing", Pearson Education, India.
2. J.S.R. Jang. C.T. SUN and E. Mizutani, "Neuro-fuzzy and soft-computing". PHI Pvt. Ltd. , New Delhi.
3. Fredric M. Ham and Ivica Kostanic, "Principle of Neuro Computing for Science and Engineering", Tata McGraw Hill.
4. S. Haykins, "Neural networks : a comprehensive foundation". Pearson Education , India.

PRACTICALS

CPEC 9402 COMMUNICATION SYSTEM LAB. (0-0-3)

List of Experiments
(experiment 1, 2, 3, 5, and 6 are compulsory . Do atleast one from the rest.)

1. Radiation pattern of Horn Antenna at Microware frequency.
(3 hours)
2. Measurement of unknown impedance and matching at Microwave frequency.
(6 hours)
3. Study of a Satellite Earth station and design of its Antenna to meet a given specification.
(6 hours)
4. Study of a Satellite Transponder of given specification, channel allocations CDMA facilities etc.
(6 hours)
5. Measurement of Refractive Index profile, Numerical Apshure attenuation and dispersion in a multimode optical fiber.
(9 hours)
6. Establishing and Testing an optical Fibre Communication Link.
(6 hours)
7. Designing an optical fiber communication link to a given specification.
(6 hours)
8. Simulating TDM and WDM.
(6 hours)

CPEC 9403 VLSI LAB EXPERIMENTS (0-0-3)

1. Characteristics of NMOS .
2. Characteristics of CMOS
3. Stick diagram , introduction to λ rules .
4. Implementation of inverter, NAND and NOR gate
5. Design of Half Adder
6. Design of Full Adder
7. Design of a multiplexer
8. Design of decoder circuits
9. Design of Latch, S-R flip-flop, D flip –flop
10. Design of Memory circuits.

a) Lab. '1' through '4' can be done using Tanner Spice/magic tools
b) Lab '5' through '10' should be done suing Xilnx or IRSIM or any other open source tools. (GPSPL).

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.

CPEC 5404 MOBILE COMMUNICATION (3-1-0)

Module – I (12 hours)

A brief introduction to Mobile Telephony, Technologies and Choices.
Cellular Concept – System Design: Fundamentals: Frequency reuse, Channel Assignment, Handoff Strategies, Interferences and System Capacity, Trunking and Grade of Service; Improving coverage and capacity in Cellular Systems – Cell Splitting, Sectoring, Repeaters and Range Extension, Microcell & Picocell Zone Concept. Antennas for Base Station and hand held Cellular phone.

Module- II (14 hours)

Mobile Radio Propagation : Large –Scale path loss, Ground Reflection Model , Diffraction, Scattering. Outdoor propagation Model – Okumura Model; Indoor Propagation Model: Partition loses, Log distance Path loss Model.

Small Scale Fading and Multipath, Dopper Shift . Types of Small Scale Fading and their effect on received signal.

Modulation Techniques:

FM for Analogue . FM Detection Techniques – PLL and Quadrature Detection. Digital Modulation: π / 4 QPSK and MSK, GMSK.

Module – III (14 hours)

Spread Spectrum Techniques – DS-SS and FH- SS.

Performances of FM, π /4 QPSK & MSK in Fading and Interference .

Fundamentals of Equalization – adaptive Equilizer. Diversity Techniques – Space, frequency Polarization and Time Diversity.

Multiple Access Techniques :

Frequency Division Multiple Access (FDMA) , Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access – Frequency Hopped Multiple Access (FHMA), Code Division Multiple Access (CDMA). Frequency and Channel specification for CDMA Digital Cellular Standard (IS-95) .

Module - IV (07 hours)

Wireless Networking :
Various Generations of Wireless Networks, Fixed Network Transmission Hierarchy, Traffic Routing in Wireless Networks – Circuit Switching, Packet Switching. The X . 25 Protocol.

Global System for Mobile (GSM): features, architecture, channel types, Frame Structure in GSM. Signal processing in GSM.

Text Books :

1. Wireless Communication, 2nd Edition by Theodore S. Rappaport , Pearson Publication.

Additional Books:

1. Mobile Communication Engg., 2nd Edition by William C. Y. Lee Mc Graw Hill International Edition.
2. Mobile Cellular Communications, 2nd Edition by William C. Y. Lee Mc Graw Hill International Edition.
3. Mobile Communication, 2nd Edition by Jocken Schiller, Pearson Education.
4. Wideband Wireless Digital Communication by Andreas F. Molisch Editor Pearson Education.

PEEC 5403 INTERNET SECURITY AND PROFESSIONAL ETHICS (3-0-0)

Module-I

The security Problem in Computing: Introduction to computer Security: Attacks, goals method of defense (stream, Block) Cryptanalysis, Elementary Cryptography: 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.

Database Security: Security requirements, Reliability and integrity, sensitime data, Inference, multilevel database, proposals for multilevel security.

Module-III

The key distribution problem and public key cryptography,

Digital Signature: Message Digest, Implementation of Authentication, Data integrity & nonrepudiation.

Network and Transport Security Protocol: Internet Protocol Security: Architecture & services Authentication header protocol, Encapsulating Security payload protocol (Transport & Tunnel modes) secure socket layer, record layer protocol.

Application Layer Security Protocol: MIME, S/MIME, Secure electronic transaction

Module-IV

Measuring losses, Identifying introdurs, and case studies.

Security services and mechanisms: Standards, guidelines and regulations: The Internet Engineering Task Force, ANSI X9, National Institute of standards and Technology, Case studies on cryptography and security: SSO, DOS, Attacks, IP spooting attacks contract signing, virtual election, secure multiparty calculation.

Text Book

1. Security in Computing Third Edition Charles P. Pfleeger, Shari Lawrence Pfleeger, PHI.
2. RSA Security's Official Guide to CRYPTOGRAPHY-Steve Burnett & Stephen Paine-TMH

Reference Book

1. Cryptography and Network Security-KAHATE-TMH

PEEC 5404 CORE JAVA (3-0-0)

Module – I (10 hours)

Introduction to Java and Java programming Environment. Object Oriented Programming.

Fundamental Programming Structure : Data Types, variable, Typecasting Arrays, Operators and their precedence.

Control Flow:

Java's Selection statements (if, switch, iteration, statement, while, do-while, for, Nested loop).

Concept of Objects and Classes, Using Exiting Classes building your own classes, constructor overloading, static , final this keyword .

Inheritance :

Using Super to Call Super class constructor, Method overriding, Dynamic method Dispatch, Using Abstract Classes, Using final with inheritance.
The Object Class.

Module – II (10 hours)

Packages & Interfaces :

Packages, Access Protection, Importing package, Interface, Implementing Interfaces, variables in Interfaces, Interfaces can be extended.

Excepting Handling:
Fundamentals, Types Checked , Unchecked exceptions, Using try & catch, Multiple catch, throw , throws, finally, Java's Built in exceptions, user defined exception.

Multi Threading

Java Thread Model, Thread Priorities, Synchronization, Creating a thread, Creating Multiple

threads, Using is Alive ( ) and join ( ), wait () & notify ( ).

String Handling :
String constructors, String length , Character Extraction , String Comparision, Modifying a string.

Exploring Java-lang:
Simple type wrappers, Runtime memory management, object (using clone () and the cloneable Interface), Thread, Thread Group, Runnable .

Module III (10 hours)
Java util : The Collection interfaces, Collection Classes, Use of Iterator, The Collection Algorithm, The legacy classes & interface, string Tokenizer, Random, Observable.

Java i.O: Classes & Interfaces, Stream classes, Byte streams , Character streams, Serialization.
Networking :
Basics, Socket overview, Networking classes, & interfaces, TCP/IP client sockets, whois, URL format, URL connection, TCP/IP Server Sockets.

Applets :
Basics , Architecture , Skeleton, The HTML APPLET Tag, Passing Parameters to Applets, Applet context and show documents ().

Event Handing :
Delegation Event model, Event Classes , Event Listener Interfaces, Adapter classes.

Module IV (10 hours)
AWT :
AWT Classes window fundamentals, component, container, panel, Window, Frame , Canvas, Creating a frame window in an Applet , working with Graphics , Control Fundamentals , Layout managers, Handling Events by Extending AWT components.
Core java API package, reflection, Remote method Invokation (RMI)

Swing :
J applet, Icons & Labels , Text fields , Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees, Tables.

JDBC : Fundamentals, Type I,Type II, Type III, Type IV drivers.

Text Books
1. The complete reference Java 2 by Herbert Schildt .
2. Balguruswamy, Programming with JAVA, TMH.

PEBM 8401 BIO-MEDICAL INSTRUMENTATION AND MEASUREMENTS (3-0-0)

Module - I (11 hours)

Biokmetrics, Man-Instrument System, Problems encountered in measuring a living system .

Review of Transducers. Transducers for Biomedical applications

Sources of Bioelectric Potentials - Resting and Action Potentials. Propagation of action Potential. Bioelectrical Potentials - Electrocardiagram. Typical human electro encephalogram, electromyogram.

Electrodes : Electrode Theory, Biopotential Electrodes, Microelectrodes, Body surface electrodes . Bio chemical Transducers – the pH electrodes, Blood Gas Electrodes.

Module - II (10 hours)

Cardiovascular Measurements:

Electrocardiography; Measurement of Blood Pressure – Programmed electrosphygm Manometer. Measurement of Blood flow and Cardiac output. Measurement of Heart Sounds Frequency Spectrum of heart. **Module - III**

(10 hours)

Measurements on Nervous System

Psychophysiological Measurement – Polygraph , EEG, Brain Imaging –X-Ray, Computed Tomography (CT), MRI. Eye-Electrorefinogram (ERG), Opthalmoscopy, Audiometry, Electromyography (EMG).

Measurement in Respiratory System: Pulmonary Volume and its measurement-spirometer. Pneumotachometer. Kidney Imaging: Pyelogram. Hemodialysis, Peritonal Dialysis. Skin: Water loss, Flow Hygrometry. Colour Dermaspectrometer (6 hours)

Module – IV (9 hours)

Non-invasive Diagnostic Measurements.

Body Temperature Measurement : Electronics Thermo meter. Skin Temperature Measurement-Thermography. Principle of Ultrasonic measurement - Ultrasound, Modes of Transmission , Ultrasonic imaging, Ultrasonic Diagnosis.

Computers in Biomedical Instrumentation. Computer Analysis of ElectroCardio-gram, Patient Monitoring, Computerized Axial Tomography (CAT) Scanner and other applications.

Text Books:

1. Biomedical Instrumentation and Measurements, 2nd Edition, by L. Cromwell, F. J. Weibell and E. A. Pfeiffer. Pearson Education.
2. Bioinstrumentation by John. Webster – editor, John Willey students' Edition.

Additional Readings:

1. Introducation to Biomedical Equipment Technology, 4th Edition by Joseph J. Carr and John M. Brown, Pearson Education.
2. Biomedical Digital Signal Processing – By Willis J. Tompkins – Editor, Prentice Hall of India .

PEEC 5406 RADAR AND TV ENGINEERING (3-0-0)

Radar Engineering

Module – I (12 hours)

Radar Block diagram, Radar Equation, Information available from Radar Echo, Radar Frequencies.
Prediction of Radar Range
Minimum detectable signal, Receiver noise, SNR Probability of false alarm, Probability of Detection, Integration of Radar Pulses, Radar Cross Section of Targets, Transmitter Power, PRF and Range ambiguities, Antenna parameters, System losses, Propagation effect.
FMCW Radar
Triangular and sinusoidal modulation, Beat frequencies, Altimeter, Multiple frequency CW Radar.

Module – II (14 hours)

MTI Radar : Delay line Cancller – Filter characteristics, Blind speed, Multiple and staggend Prf. Sub-clutter visibility. MTI using Range Gates and Filters, Pulse Doppler Radar.

Tracking Radar : Sequential lobing, Conical Scan Monopulse tracking Radars.

Phased Array Radar – Principles of Electronic Scanning, Description of a Phased Array Radar.

Television Engineering

Module – III (14 hours)

Basic Television System. The interlaced scanning.

Composite Video Signal. Horizontal and Vertical Synchronous and Blanking Standard Signal. Sound Modulation. Reception of vestigial side band signal .

Television Camera tube – Vidison . CCD Image Sensors .

Colour Television Signals and Systems colour fundamentals, colour TV Camera . Colour TV Signals. Colour TV Transmission

The NTS System : (5 hours)

Block diagram of a TV Transmitter, Design Principles of TV Transmitter. TV Antenna.

Broudcast TV Receiver : (6 hours)

Block Schematic and Functional requirement . Colour Television receiver. Digital Colour TV receiver. Specifications for Monochrome and Colour TV Receiver in India.

Text Book :

1. Television and Video Engineering by AMD hale, 2nd edition Tata Mcgraw Hill
   Selected portion from Chapter 2,3,4,8,7,9, and 10

Additional Book :

1. Monochrome and Colour Television by R. R. Gulati, Wilay Eatern Ltd.,
2. Fundamental of Television Engineering by G. M. Glasford TMH Edition

PEEC 5407 E-COMMERCE (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 5408 ADVANCED JAVA (J2EE) (3-0-0)

Module – I

a) J2EE platform, Architecture and container Developing J2EE, Applications, J2EE runtime, J2EE APPIS, Directive services and JNDI naming services.

Module-II

Distributing computing using socket RMI, Architecture, Stub, skeletons and remote reference layer, Database programming with JDBC for connection I, II and III

Module–III

Introduction to web containers, serve let programming , replacing CGI with server lets, Serve let life cycle , init (), service(), destroy(), request and response for Generic server lets class. HTTP servelet class, servert sessions techniques with cookies.

Module – IV

JAVA server pages, Basic and architecture, JSP directives, scripting elements, scriptlets , standard actions, writing JSP applications with tag libraries. , Introduction to JAVA beans and EJB architecture and writing small programs.

Text Books

1. Professional JAVA server programming J2EE 1.3 edn. S. Allamamaraju and others.
2. Complete Reference J2SE 5th Edn. TMH., Keogh.

References :

1.Programming Java Server pages & servelets . Er.V.K.Jain , Dreamtech Press

2. JAVA serverpages SPD- O'Really by Bergstern

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 :

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,

PEEC 5410 INFORMATION SYSTEMS AND 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, selection the project , development stragegy.

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.

MODULE-IV

System Engineering and Quality Assurance : Designing reliable and maintainable systems. 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, Post Implementation review

managing information system Development: Estimation and management of development time, Personnel and Development Management, structured walkthroughs.

Text Book :

1. Analysis & Design of Information Systems, A. James Senn, Tata McGraw Hill

Reference Books :

1. Analysis & Design of Information Systems , V.Rajraman
2. System Analysis and Design , Award – PHI
3. System Analysis and Design, Whitney & Bertley , Pearson Edn.

PEEC 5411 ADVANCED COMMUNICATION SYSTEMS (3-0-0)

Module – I (12 hours)

Review of Fundamental Concepts of Data Communication.

Data-Link Protocol and Data Communications Networks.

Data-link Protocol Function, Character and bit Oriented Data Link Protocols. Asynchronous Data Link Protocols, Synchronous Data-Link Protocols, Synchronous Data –Link Control, High-Level Data Link Control, Public Switched Data Networks, CCITTX. 25, User-to-Network Interface Protocol. Integrated Services Digital Network (ISDN) . Asynchronous Transfer Mode (ATM). Local Area Networks. Ethernet.

Module - II (12 hours)

Digital T-Carriers and Multiplexing .

Time-Division Multiplexing (TDM); T1 Digital Carrier. North American

Digital Hierarchy. Digital Carrier Line Encoding. T Carrier Systems, Digital Carrier Frame Synchronization. Bit Vrs Word Interleaving. Statistical TDM. Codecs and Combo Chips. FDM. AT & T's FDM Hierarchy. Composite Base band Signal . Formation of Master group. Wavelength Division Multiplexing (WDM).

Module – III (10 hours)

Digital Cellular Telephone – Time Division Multiple Access (TDMA), Control Channel, Voice Channel, Speech Coding, Digital Modulation Scheme. Interim Standard 95 (IS-95) –CDMA. Global System for Mobile Communication (GSM). Personal Satellite Communications System (PCSS). Iridium Satellite System .

Module – IV (10 hours)

Microwave Radio Communications :

Microwave Radio Frequency assignments. Advantages and Disadvantages of Microwave Radio. FM Microwave Radio System. Diversity. Protection Switching arrangements. Repeater Station. LOS Characteristics Microwave Radio System Gain.

Satellite Multiple Accessing Arrangements. FDM/FM Satellite Systems. FDMA, TDMA, CDMA. Global Positioning Systems (GPS).

Text Books:

1. Advanced Electronic Communication Systems Sixth Edition by Wayne Tomasi , Pearson Education. Selected Education from 4,5,7,12 and 15.

Additional Reading :

1. Wideband Wireless Digital Communication by Andreas F. Molisch-Editor, Pearson Education.

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)