First Year First Semester

Hum/T/A HUMANITIES-A

English - 2 Pds/week - 50 Marks
Sociology - 2 Pds/week - 50 Marks

HUMANITIES

1.Basic writing skills
2.Report, Covering Letter & Curriculum-Vitae writing
3.Reading and Comprehension
4.Selected Short Stories

Text Book: ENGLISH FOR ALL

SOCIOLOGY

1.Sociology: Nature and scope of Sociology - Sociology and other Social Sciences - Sociological Perspectives and explanation of Social issues
2. Society and Technology: Impact of Technology on the Society - A case study
3. Social Stratification: Systems of Social Stratification - determinants of Social Stratification - Functionalist, Conflict and Elitist perspectives on Social Stratification
4.Work: Meaning and experience of work: Postindustrial society- Post-Fordism and the Flexible Firm
5.Development - Conceptions of and approaches to development - The Roles of State and the Market in the Development
6. Globalization: The concept of globalization - globalization and the nation state - Development and globalization in post colonial times.
7. Industrial Policy and Technological change in India - The nature and Role of the State in India
8. Technology Transfer: The Concept and Types of Technology Transfer-Dynamics of Technology Transfer
9. Technology Assessment: The Concept - Steps involved in Technology Assessment
10. Environment: Sociological Perspectives on Environment - Environmental Tradition and values in ancient India
11.The Development of Management: Scientific Management - Organic Organization - Net Work organization - Post modern Organization - Debureaucratization - Transformation of Management
12. Technological Problems and the Modern Society: Selected Case Studies - Electric Power Crisis, Industrial and/or Environmental Disaster, or Nuclear Accident

ET/T/112 ELECTRON DEVICE- I

Semiconductor statistics : Statistical description of system of particles, statistical distribution functions, Pauli exclusion principle, Maxwell- Boltzmann, Fermi- Dirac, & Bose -Einstein distribution. Semiconductor physics : Electrical conductivity of metals &

semiconductors: free electron theory of metals, Sommerfeld theory, motion of electrons in a periodic structure, Bloch theorem, Kronig-Penny model & nearly free electron model, energy bands, Brillouin zones, reciprocal lattice vector, Fermi surface, density of states, carrier concentration in semiconductors, concept of holes, elemental and compound semiconductors, intrinsic & extrinsic semiconductors, degenerate & nondegenerate semiconductors, doping & compensation, traps, recombination & lifetime, surface states, surface recombination velocity. Electron transport: Lattice vibrations of monoatomic lattices, lattice with two atoms per primitive cells, dispersion relations, quantisation of lattice vibrations (phonons), scattering mechanisms & mobility of charge carriers, qualitative discussion on the phonon & impurity scattering mobilities, dependence of carrier mobility on lattice temperature & impurity concentration. Concept of field dependent mobility, diffusion, Einstein's relation, Poisson's Eqn., continuity Eqn. C- LANGUAGE AND DATA STRUCTURES Introduction to computer, solving problems on a computer- flowchart, algorithm, steps to run a program on computer. Features of C- language: character set, data types, operators and expressions, data input and output, control statements, functions, arrays, pointers, structures and unions, data files; Built-in data structures - one-dimensional arrays, two-dimensional arrays, records; Introduction to Stacks, Queues and Linked lists; Sorting and searching algorithms, elementary notion of analysis of algorithms.

ET/Math/T/113 MATHEMATICS – IG

Successive differentiation. Leibnitz theorem, Rolle’s theorem (statement only), Mean value theorems, Taylor’s and Maclaurin’s theorem in finite and infinite form, Indetermine forms; Functions of two independent variables: their limits and continuities, Partial derivatives, Euler’s theorem: Partial derivatives of composite and implicit functions. Jacobians, Taylor’s theorem (statement only). Maxima and minima, Lagrange’s method.

ET/Math/T/114 MATHEMATICS – IIG

Vector Algebra: Addition of vectors, Multiplication of vector by a scalar, Scalar and vector product of two vectors. Scalar and vector triple product, Applications to mechanics, Vector Calculus: Differentiation of a vector function; Directional derivatives – gradient, divergence and curl; Relations involving them. Theorems of Green, Gauss and Stoke.

Complex Analysis: Complex numbers. D’Moivre’s Theorem; Exponential values of sine and cosine; Functions of a complex variable; Limit continuity and differentiability, Cauchy – Riemann conditions, Complex integration, Cauchy’s fundamental theorem, Cauchy’s integral formula; Taylor’s theorem, Laurent’s theorem, Poles and residues, Contour integration, Conformal mapping, Schwarz-Christoffel Transformation.

Ph/T/1B PHYSICS-IB

1. Use of vectors in particle mechanics, Unit vectors in spherical and cylindrical polar coordinates, Conservative vector fields and their potential functions - gravitational and electrostatic examples, Gradient of a scalar field, Equipotentials, States of equilibrium, Work and Energy, Conservation of energy, Motion in a central field and conservation of angular momentum.
2. Angular momentum of a system of particles, Torque, Moment of inertia , Parallel and Perpendicular axes theorem, Calculation of moment of inertia for (i) thin rod, (ii) disc, (iii) cylinder and (iv) sphere. Rotational dynamics of rigid body (simple cases).
3. Motion of fluids, Bernoulli's equation and its applications, motion of viscous fluids - Poiseuille's equation.
4. Simple harmonic motion, Composition of simple harmonic motion, Forced vibration and resonance, Wave equation in one dimension and travelling wave solution, Standing waves, Wave velocity and group velocity.
5. Assumption for the kinetic theory of gases, Expression for pressure, Significance of temperature, Deduction of gas laws, Qualitative idea of (i) Maxwell's velocity distribution. (ii) degrees of freedom and equipartition of energy, Specific heat of gases at constant volume and constant pressure.
6. Macroscopic and microscopic description, Thermal equilibrium, Zeroth law of thermodynamics, Concept of international practical temperture scale, Heat and Work, First law of thermodymamics and some applications, Reversible and irreversible processes, Carnot cycle, Second law of thermodymamics, Concept of entropy, Thermodynamic relations.
7. Statistical description of a system of particles, Phase space, Microstates and macrostates, Boltzmann's formula for the entropy, Canonical partition function, Free energy and other thermodynamic quantities in terms of the partition function, Classical ideal gas, Equipartition theorem and its applications.

ET/T/116 C LANGUAGE & DATA STRUCTURES

Introduction to computer, solving problems on a computer- flowchart, algorithm, steps to run a program on computer.
Features of C- language: character set, data types, operators and expressions, data input and output, control statements, functions, arrays, pointers, structures and unions, data files;
Built-in data structures - one-dimensional arrays, two-dimensional arrays, records;
Introduction to Stacks, Queues and Linked lists;
Sorting and searching algorithms, elementary notion of analysis of algorithms.

Ph/S/1 PHYSICS LABORATORY

(Selected Experiments from the following)

1. Determination of Galvanometer resistance by half - deflection method.
2. Determination of Galvanometer resistance by Thomson's method.
3. To find high resistance by Galvanometer deflection method.
4. To measure mechanical equivalent of heat, J by electrical method (Joule's) using

copper calorimeter (radiation correction to be done).
5. To compare to low resistance by drop of potential method.
6. To determine resistance per unit length of wire by using Carey Foster bridge.
7. To estimate strength of a current by using copper voltmeter.
8. a) To compare the EMF's of two cells by using a potentiometer
b) To measure current by using a potentiometer
9. To measure the horizontal components of earth's magnetic field intensity using deflection and vibrating magnetometers.
10. Determination of co efficient of linear expansion by optical lever method.
11. Determination thermal conductivity of metal by Searle's method.
12. To determine co-efficient of viscosity by Capillary flow method.
13. Determination of Young's modulus by Flexure method.
14. To draw mutual and anode characteristics of triode and hence too fine Rp, μ, and gm
15. To draw the transistor characteristics (NPN/PNP) in the given configuration and hence to find hi, hf
16. Determination of refractive index of the material of the glass prism by prism spectrometer (for at least two ?s)
17. Study of collisions in one dimension using a linear air track
18. Use of an air track for obtaining potential energy curves for magnetic interactions.
19. Study of oscillations under potential wells of various shapes using an air track.
20. Experiments on diffraction in single slit, double slit and plane grating using He- Ne laser
a) To find the wavelength of a monochromatic light by single slit.
b) To find slit separation of a double slit.
c) To find number of rulings per cm of a plane grating
21. To find the wavelength of a monochromatic light by Newton rings.
22. Fabry-Perot interferometry: To find out separation of wavelength of sodium D1 & D2 lines.

BED/ME/S/1 BASIC ENGINEERING DRAWING

Drawing primitives: instruments, letters, lines, title block, geometric curves & shapes, scale and dimension.
Projection: orthographic and isometric, sectional views.

ET/S/113 PROGRAMMING LABORATORY

Programs related to "C Language & Data Structures".

WS/ME/S/6A WORKSHOP PRACTICE-VI (Carpentry and Fitter Shop)

Introduction to types of Indian woods used for engineering purposes and carpenter’s tools; use of wood working machines; making of selected joinery.
Introduction to fitter’s tools, gauges, measuring instruments etc.; marking of jobs; fitter’s job involving chipping, filing, sawing, drilling; use of taps and dies; pipe fittings and plumbing.

First Year Second Semester

ET/T/121 CIRCUIT THEORY

Passive circuit elements and their equilibrium equation, Kirchoff's Laws, Concepts of independent voltage and current sources, controlled Sources. Node equation and Loop equation Techniques. Introduction and Application of Graph theory in electrical networks. Solution of circuit problems by Using Differential equation approach. Concept of steady state and transient Response. Fourier series and Fourier transform. Laplace transform with Inversion formula. Application of Laplace transform in the solution of Circuit problems. Convolution Theorem. Concept of impedance function. Introduction to Coupled Circuits and their controlled source representations. Concept of discrete time circuits z transform, simple switched capacitor networks. Sinusoidal steady state analysis of circuits. Frequency domain Analysis, Concept of phase and amplitude, Vector Representations. Resonance. Network Theorems: Superposition, Reciprocity, Thevenin's, Norton's & Maximum Power Transfer etc.

ET/T/122 ELECTRON DEVICE- II

Metal-semiconductors Junction: Band diagram, depletion region & capacitance, ohmic & rectifying contacts, Schottky diodes. Semiconductor-Semiconductor Junction: Basic device technologies for fabrication of a p-n jn., homojunction & heterojunctions; equilibrium band diagram, charge, field & potential profiles in p-n junctions., depletion region, depletion capacitance, biased p-n junctions., diode eq. & diode characteristics, diffusion capacitance, circuit models of p-n junction diode. Breakdown mechanisms in p-n junctions.: Avalanche & Zener processes & their dependence upon temperature & doping. Degenerate p-n junctions.: Band model under large doping condition, Tunnel diode, I-V characteristics, equivalent circuit, applications, Backward diode. Metal-Insulator-Semiconductor junction: Band diagram. Bipolar Transistors: Band diagram, the transistor action, current components in a BJT, current amplification factors, Early effect & its consequences, different modes of operation, input & output characteristics, load line & amplifier operation, Ebers-Moll eqs., large signal model, dependence of current gain factors on temperature, frequency and physical & electrical parameters, low frequency equivalent circuits, gain & noise parameters calculations, high frequency equivalent circuit. Junction field effect transistor (JEET): Principle of operation, JFET parameters, eqv. Circuit, JEET biasing, self bias, design of bias circuits, load line, amplifier characteristics. Insulated gate field effect transistor (IGFET) : constructoin & principle of operation of p- & n-channel enhancement & depletion mode MOSFETs, drain & transfer characteristics, threshold voltage & its control, PSG & SOI systems, CMOS inverter, speed of operation, V-MOS construction, operation & characteristics, CCD: construction & principle of operation. Power Semiconductor Devices: Semiconductor Controlled Rectifier, construction & operation, forward & reverse characteristics, triggering methods, SCR specilifications, SCR control, Shockley diodes, diac, triac: operation & characteristics; Unijunction Transistors (UJT), UJT control of SCR, Programmable UJT; V-MOS construction, operation & characteristics; IGBT characteristics. Switching characteristics of devices: Switching phenomenon in diodes, BJT, MOS & CMOS,

switching times, switching speeds, speed up capacitor. Basic optoelectronic devices: Light emitting diode, Liquid crystal display, Solar cell, Photodiode, phototransistor, Seven segment display.

ET/Math/T/123 MATHEMATICS – IIIG

Abstract Algebra : Sets and set operations: D'Morgan's Laws, Cartesian product of sets; Binary relations: equivalence relations, partial ordering relation, Lattice, Boolean algebra, Semigroups, Groups; Subgroups, Cyclic groups, Normal subgroups; Quotient groups, Homomorphism and isomorphism theorems. Rings, Polynomial rings, fields, subfields. Linear Space, Linear dependence and independence. Basis, Dimension; Normal Linear space, Inner product space.

ET/Math/T/124 MATHEMATICS – IVG

Linear transformations and matrices: Conformability of matrix sum and product; Types of matrices. Determinants and their properties. Rank of a matrix, Condition for the existence of solutions of a system of linear equations and their uniqueness, Characteristic equation of a matrix, Cayley Hamilton Theorem; Eigenvector and eigenvalue of a matrix (linear transformation).
Sequence and infinite series of positive terms: Their convergence or divergence; Comparison test; D'Alembert's ratio test and Cauchy's root test.
Exact equation of first order , 1^{st} order linear equation Solution of ordinary second order linear differential equation of with constant coefficients, Ordinary point and regular singular point of equations with variable coefficients. Method of Frobenius, Bessel and Legendre functions. Solution of system of ordinary linear differential equations, Method of phase plane, Critical point and stability.

AM/ME/T/1B ENGINEERING MECHANICS

Statics:
Introduction, Idealizations of Mechanics, Fundamentals of Vector Algebra, Application of Vectors in Mechanics, Equiv System, Equilibrium, FBD Concept, Fundamentals of Friction, Properties of surface, Centroid, Moment of Inertia
Dynamics:
Intro to vector calculus, Definition of vectors in Dynamics, Rectilinear Motion, Curvilinear motion of particle and description of different coordinate systems, Kinetics, Newton's Law and D' Alembert's principle and application to rectilinear and curvilinear motion, constrained motion, Energy and Momentum methods.

Ph/T/2B PHYSICS-IIB

1. Biot-Savart law and Ampere's law in magnetostatics, Calculation of magnetic field in simple situations like (i) straight wire (ii) circular wire (at a point on the symmetry axis) and (iii) Solenoid.
2. Time-varying fields, Faraday's law of electromagnetic induction, Self and mutual

inductance, Resonance and oscillation in electrical circuits.
3. Nature of light waves, Interference of light waves, Young's experiment, Spatial and temporal coherence, Fresnel bi-prism, Interference in thin film, Newton's rings, Measurement of film thickness and wavelength, Diffraction of light waves, Huygen's construction, Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction due to single slit and plane diffraction grating, Approximate rectilinear propagation of light, Zone plate, Polarisation of light waves, Polarisation by reflection, Brewster's law, Double refraction- ordinary extraordinary rays, Polaroid, Optical activity.
4. Energy levels of the hydrogen atom and the Bohr atom model, X-ray spectra, X-ray diffraction, Bragg's law, Compton effect. De-Broglie waves, Particle diffraction, Uncertainty principle and its application
5. Wave-particle duality and uncertainty principle, Two-slit experiment,
Concept of wave function, physical interpretation of wave function, Probability density, current, equation of continuity, Time independent Schrodinger equation for a free particle and a particle in a potential, Stationary states, Postulates of quantum mechanics, expectation values of physical observables, energy eigenvalues for particle in a box, Square well potential, Reflection and transmission coefficient in potential barriers, Linear harmonic oscillator, Particle in a central potential, Orbital angular momentum, Hydrogen atom- energy levels, degenaracy.

ET/S/121 NUMERICAL ANALYSIS LABORATORY

ET/S/122 CIRCUIT THEORY LABORATORY-I

Experiments related to "Circuit Theory".

ET/S/123 ELECTRON DEVICES LABORATORY

Experiments related to "Electron Device-I and Electron Device-II".

WS/ME/S/12B WORKSHOP PRACTICE-XII (Machine Shop)

Introduction to machine tools - lathes, drilling machines, shaping machines, planning machines, slotting machines, milling machines, grinding machines; machine shop work involving different operations by using the above mentioned machines through making of jobs.
Experiments on: Study of the speed structure of a lathe, study of apron mechanism and calibration of feeds in a lathe.
Study and grinding of various cutting tools.

Second Year First Semester

ET/T/211 ELECTROMAGNETIC THEORY

Fundamentals of Vector Algebra, Vector Calculus, Physical Interpretation of Differential Vector operations, Green's Theorem, Divergence & Stoke's Theorem, concept of scalar &

vector Fields. Electrostatics, Gauss Law, Electric Potential, Laplaces'& Poissons' Eqnation, Boundary value problems, Method of Images, Energy storage in Electric Field. Magnetostatics, Faradays Law ,Amperes Law Dielectric & Magnetic Media, Biot Savart's Law, Magnetic Vector Potential, Relationship Between ES & MS Fields. Equation Of Contimuity For Steady & Time Varying Currents, Maxwell's Law, Displacament Current & Displacement Current Density, Wave Equation, Phasor Concept for Time Harmonic Fields, Plane Waves in Simple Media & Lossy Media, Imhmogeneity & Ansotropy. Polarization, Poincare sphere, reflection & refraction at different Interfaces, Brewsters' Angle, Total Internal Reflection. Poynting Theorem,- General & Complex, Power & Power Density, Case studies for Power Flow Calculations. Magnetic current concept, Herz Potentials, Equivalence of Electric & Magnetic sources.

ET/T/212 NETWORK SYNTHESIS

Tellegen's Theorem, Driving point impedance function for a passive one port and their Positive real functions and their properties. Testing procedures for PR functions. Derivations of the properties of RC and LC one port network and their synthesis procedures. Passive two port networks, different representation schemes, Image impedance parameters. Concept of symmetry, characteristic impedance and propagation constant. Concept of open circuit voltage transfer function. Convolution integral, concept of impulse response. Derivation of the synthesis procedure for LC and RC passive open circuit two ports. Design procedures for filters with resistance termination. Limitations of passive RC two port realizations. Concept of active filters. State variable representation of electrical circuits. Active Realization of state variable active filters.

ET/T/213 SIGNAL THEORY & NOISE

INTRODUCTION Signal definition, different type of signals: Analog & discrete. Time domain and frequency domain representation. Periodic and aperiodic signals. Signals and vector analogy. Othogonality of signal functions.

Fourier series and its different forms. Series of some useful functions. Normalized power and power spectral density. Fourier transform, inverse Fourier transforms, Transform of some usefulsunctions. Convolutionand correlation in time domain and frequency domain. Some properities of Fourier transform. Perseval's theorem, Sampling theorem, Sampling and reconstraction of signals, Familiarisation with MATLAB tools for signal analysis, Poisson distribution. RANDOM VARIABLES & PROCESSES Probability, events, mutually exclusive events, joint probability etc. Random variables and processes: Statistical properties; Cumulative distribution functions, Probability density functions, mean, variance, standard deviation probability demsity functions. Auto correlations, Stationary and ergodic processes,Poisson,Gaussian,Reyleigh and other distribution functions NOISE Some sources of noise. Mathematical representation and frequency domain representation. Spectral components of noise,Power spectral density, effect of filtering of noise: Linear filtering, integration,differentiation and its effect on PSD and PDF,. Super position of noises, Mixing of noise. Quadrature component representation of noise, power spectral density Calculation of quadrature components. Noise band width.

Suggested Text Books:

1. Principle of Communication System: H.Taub & DL Schilling (McGraw-Hill International Edition)
2. Signal Processing & Linear System: B.P.Luther Berkely-Cambridge Press (1998)

ET/T/214 DIGITAL LOGIC CIRCUITS

Number Systems : Decimal, Binary, Octal and Hexadecimal systems, conversion from one base to another. Codes :BCD, Excess- 3, Gray Reflected ASCII, EBCDIC. Algebra for logic circuits: Logic variables; Logic constants; Logic functions- NOT, AND, OR, NAND, NOR, Ex-OR; Boolean Algebra (including Shanon's expansion theorem and consensus theorem); Cannonical representations-minterm, maxterm; Karnaugh map simplification, Quin Maclousky minimization. Families of logic circuits: Transistor inverter, RTL, Diode logic, DTL,TTL,Brief introduction to DCTL,IIL,HTL,ECL and MOS gates. Combinational circuits: Analysis and synthesis of combinational circuits, Multiplexer, Demultiplexer, Encoder, Decoder, Code-converter, Adder, Subtractor, Comparator, Parity generator/checker, Priority encoder. Sequential Circuits: Flip-flops- SR, JK, D and T; Registers- Buffer registers, shift registers etc.; Counters- Asynchronous and synchronous counters; Interface circuits: Digital to Analog converter (DAC) - weighted resistor method, R-2R ladder method; Analog to Digital converter (ADC) - parallel comparator method, counter method, successive approximation method, dual-slope method.

ET/T/215 ANALOG CIRCUITS-I

1. DIODE CIRCUITS Ideal and piecewise linear models of diode, graphical analysis; Analysis and design of circuits-transient switching characteristics of diodes; Clippers, clampers, rectifiers, zener regulators; Power supplies, surge studies, I^2-t curve; Power supply filters. 2. BJT AMPLIFIERS Analysis and design of different biasing circuits (including stability) for BJT amplifiers, BJT biasing for integrated ckts, h-parameter model of BJT, mid frequency and low frequency analysis of CE, CB and CC amplifier, Hybrid-pi model of BJT, high-frequency analysis of BJT amplifiers, transistor as a switch; transient switching characteristics of transistors. Numerical solution for large signal amplifiers-covergence problem. 3. FET AMPLIFIERS Analysis and design of different biasing circuits for FET amplifiers, small-signal low frequency model of FET, mid-frequency and low-frequency analysis of CS,CG and CD amplifiers, small-signal high frequency model of BJT, high frequency analysis of FET amplifiers, Bode plots. 4. FEEDBACK AMPLIFIERS General theory of feedback, Barkhausen criteria, stability of feedback amplifier, different feedback topologies, effect of different parameters of an amplifier, frequency response of 2 pole/3 pole feedback amplifiers, Bode plot, gain and phase margin, compensation, method of analysis, Design examples. 5. OPERATIONAL AMPLIFIERS Diffential amplifiers using BJT and FET, Characteristics of op-amp, ideal and non ideal properties, High frequency effects on op-amp gain and phase, Bode's plot. Slew rate limitation, Linear and nonlinear circuits operations of op-amps like adder, substractor, multiplifer circuits, spice analysis of op-amp circuit, integator differentiator,

all active filters, comparators, Schmitt trigger (inv and non-inv), triggerable and non triggarable multivibrator, triangular and sinusoidal wave generator, precision rectifier, peak detector, wein bridge oscillator, phase shift oscillator, quandrature oscillator.

ET/EE/T/216 ELECTRICAL MACHINES

PART I

Single-Phase Transformer

Construction and basic principle of operation, Core type and shell type. Materials used for core. Winding and insulation,(E.M.F. equivalent circuit;) Equivalent circuit referred to primary -- phasor diagram, Polarity test, O.C and S.C. test Regulation. Efficiency. All ,day efficiency, Parallel operation.

Induction Motor

Three phase balanced excitation system. Development of rotating magnetic field. Frequency of the induced emf and relationship to number of poles. Construction and basic principle of operation of 3 phase induction motor, Slip, Slip speed and slip frequency, Per-phase equivalent circuit, Phasor diagram, Types of windings, Squirrel cage and slip-ring motor construction, Equations for torque, Torque-speed characteristics, Effect of change in rotor resistance in slip-ring machine, Methods of starting and speed control.

PART II

D.C. Machines

Construction and operating principle, Function of commutator and brush system, Armature reaction and their effects, MMF distribution, Commutation, Interlopes.

D.C. Generators

EMF equation characteristics with different excitation systems, Voltage relation. Parallel operation.

D.C. Motors

Equation for torque, characteristics with different excitation systems. method of starting. Speed control, Speed-torque characteristics.

Synchronous Machines

Alternator: Construction, EMF equation, Armature reaction with different power factor of loads, Phasor diagram, Methods of determination of voltage regulation. Parallel operation of alternators and synchronization.

Synchronous Motors

Principle of operation, Hunting, Starting method.

ET/S/211 ANALOG CIRCUIT LABORATORY-I

Experiments related to " Analog Circuits-I".

ET/S/212 DIGITAL CIRCUIT LABORATORY-I

Experiments related to " Digital Logic Circuits".

ET/S/213 CIRCUIT DESIGN LABORATORY

Specific design problems would be assigned by the teacher concerned.

ET/EE/S/214 ELECTRICAL MACHINES LABORATORY

1. EMF Induced In DC Machine
2. External Characteristics of DC shunt/compound Motor- study relations between speed, fleldcurrent and armature voltage.
3. Brake test of a DC series motor.
4. Coil connection of a single phase transformer.
5. OC and SC of a single phase transformer and determination of loss, efficiency and regulation.
6. Starting and load characteristics of a 3-phase Induction Motor.

Second Year Second Semester

ET/T/221 MATERIAL SCIENCE

Crystalline & amorphous solids, crystal structure & X-ray diffraction: periodic arrays of atoms, fundamental type of lattices, crystal directions & planes, X-ray diffraction, Bragg's law structure factor & atomic form factor of crystals, exptal methods, structure determination. Atomic packing & structure of solids: closest packing of spheres, packing efficiency, crystal defects, solid solutions. Semiconductors: Purification of s.c.s, zone refining, crystal growth-Czochralski method. Measurement of semiconductor parameters: Measurement of resistivity, Four probe method, measurement of minority carrier lifetime, Haynes-Shockley expt. Hall effect, measurement of carrier concentration. Diffusion in solids: Fick's laws, applications of Fick's laws, Kirkendall effect, atomic model of diffusion, other diffusion methods. Dielectric properties of materials: polarization & dielectric constant, temperature dependence of d.e.constant, internal field in solids & liquids, frequency dependence of d.e. constant, d.e. losses, piezoelectricity: equivalent circuit and performance of piezoelectric crystals, crystal oscillators; ferroelectricity. Magnetic properties of materials: Diamagnetism, paramagnetism, ferromagnetism. Exchange interactions, antiferromagnetism, ferrimagnetism and ferrites. Magenetic resonance. Thermoelectric properties of materials: Seebeck effect, Peltier effect, Thomson effect. Special materials: Ceramics, polymers, ionic solids, molecular semiconductors, nanostructures and nanomaterials, biomaterials and bioceramics. Superconductivity: Superconducting phenomena, Meissner effect, type I & type II superconductors, High TC superconductors, Josephson junction, SQUID. Interaction between matter and fields.

ET/T/222 DIGITAL CIRCUITS & SYSTEMS

Analysis and synthesis of sequential circuits: Basic models of sequential M/C, Analysis of asynchronous and synchronous circuits, Synthesis of completely and imcompletely specified synchronous sequential M/Cs. Fault detection and location in combinational circuits: Fault detection and location, classical methods, path sensitizing method,

Equivalent-Normal-Form method, Two level-circuit fault detection, Multi-level-circuit fault detection, Boolean difference method, SPOOF method. Digital system design: Hardware programming language (HPL), Application of HPL in designing data unit and control unit of a digital system. Timing circuits: Timing circuits using gates, Schmitt trigger, 555 timer, 74121 mono shot, retriggerable mono shot- 74122, 74123. Arithmetic circuits: Fixed-point and floating-point representation of data, serial and paralle Addition(CLA), substraction, multiplication and division algorithms (add & shift & Booths' algorithm) and their circuit implementation and division) for fixed-point signed magnitude data, fixed-point binary data in signed 2's complement representation, floating-point binary data and binary coded decimal (BCD) data. Semiconductor Memory: Read Only Memory (ROM)- PROM, EPROM, EEPROM, Random Access Memory (RAM)-static, dynamic, Memory characteristics, Memory organization and applications. Digital system design using FPGA & CPLD.

ET/T/223 ANALOG COMMUNICATION SYSTEMS

INTRODUCTION Introduction to basic elements of communication systems SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS Condition for distortionless transmission of signals through networks. Different types of distortion and their effect on the quality of output signals. Transmission of transient signals, distortion analysis. AMPLITUDE MODULATION Modulation principle and definitions, spectrum and power considerations, DSB,SSB, VSB and AM principles. Different type of modulator circuits, Transistorised modulation circuit, Square law modulator, collector modulator etc. Balanced modulator. Different circuits for generation of SSB and VSB. DEMODULATOR Basic principle of coherent detections, Square law detectors, Average envelope and peak envelope detectors. Distortions Detector circuit design. Design problems. FREQUENCY AND PHASE MODULATION Principles and definitions, Relationship between frequency and phase modulations. Phase and frequency deviations, Spectrum of FM signal, bandwidth considerations. Effect of modulation index on bandwidth, Narrow band and sideband FM and PM principles, Circuit for realization of FM and PM. Steriophonic FM Principle. DEMODULATION Principle of demodulation: Different type of demodulator, discriminator, use of PLL etc. RADIO TRANSMITTER Basic block diagram of radio transmitter (AM and FM), Analysis of a practical circuit diagram used for medium power transmitter. RADIO RECEIVER Basic block diagram of TRF, Superhetrodyne principle, its advantages. Mixer principle and circuit, AVC, Radio receiver measurement. SYSTEM NOISE CALCULATION Signal to noise ratio of SSB, DSB, AM for coherent and envelope and square law detection, Threshold effect. Signal to noise calculation for FM and thereshold.

ET/T/224 TRANSMISSION LINES AND WAVEGUIDES

Circuit representation of transmission lines, Transients in a transmission line, Sinusoidal excitation of transmission lines, Distinction between distributed and lumped constant systems, Discussions on line parameters, Characteristic impedance. Complex propagation constant, Distortions in transmission lines. Terminated transmission line. The impedance transformation, Smith chart. Impedance matching and two-port network analysis. Theory

of guided waves Parallel plate waveguide, Discontinuities in waveguide. Rectangular waveguides. Solutions of wave equations in rectangular coordinates. TE and TM modes in rectangular waveguide. Power transmission and losses in rectangular waveguide. Excitation of modes in rectangular waveguide, Characteristics of standard rectangular waveguide. Circular waveguide, Solutions of wave equations in cylindrical coordinates. TE and TM modes in circular waveguides, Power transmission and losses in circular waveguide, Excitation of modes in circular waveguide., characteristics of standard circular waveguide.

ET/EE/T/225 ELECTRICAL MEASUREMENTS

Electrical measuring instruments - their classifications, Damping and balancing. Principles of moving coil, moving iron and dynamometer type of ammeters and voltmeters, Shunt multipliers for dc and ac instrument, measurements of low medium and high resistance. AC and DC potentiometers, Conventional moving -coil instruments. Ballistic and. vibration galvanometers, Principles of thermal and induction type of indicating instruments, Frequency meters, Dynamometer wattmeter, power factor meter. AC energy meters Instrument transformers, General theory of ac bridge circuits and simple AC bridge. Magnetic measurements, principles of high voltage measurements.

ET/S/221 MATERIAL SCIENCE LABORATORY

Experiments related to " Material Science".

ET/S/222 DIGITAL CIRCUITS LABORATORY-II

Experiments related to "Digital Circuits and Systems".

ET/S/223 ANALOG COMMUNICATION LABORATORY

Experiments related to "Analog Communication Systems".

ET/EE/S/224 ELECTRICAL MEASUREMENTS LABORATORY

1. Measurement of low resistance by Kelvin Double Bridge.
2. Measurement of high resistance. .
3. Calibration of Ammeter and Voltmeter with D.C. Potentiometer.
4. Measurement of Inductance by Owen's Bridge.
5. Measurement of capacitance by Schering Bridge.
6. Calibration of Wattmeter by D.C. potentiometer.
7. Test of P.T. by absolute technique.

Third Year First Semester

ET/T/311 MICRO PROCESSORS AND MICROCONTROLLERS

Concept of pipelining and parallel processing, Uniprocessor and multiprocessor environment, Evolution of microprocessors: 8085, 8086, 80386, 80486, Pentium 2, Architecture of the above processors in both uniprocessor and multiprocessor environment, Designing systems with microprocessors, Coprocessor and I/O processors, Interfacing with peripheral devices, Memory management and protection of 80286 and onwards processors. Application of microprocessors in (i) data acquisition systems, (ii) process control, (iii) signal processing and data communication, (iv) distributed computing and networking. Processor, memory and life management in UNIX/WINDOWS. Introduction to single chip microcontrollers: Intel MCS-51 family features - 8051/8031 architecture - pin configuration - basic assembly language programming & application examples. Interfacing ICs.

ET/T/312 CONTROL ENGINEERING

Introduction to control systems, Concept of feedback. Typical Servo components and transducers: Electrical servo motors, Hydraulic Actuator, Pneumatic controller, Potentiometer, Synchros, Tachogenerator, Gears, LVDT, Pressure transducers, Accelerometer, Gyroscope, Resolver, Amplidyne, Operational Amplifier. Mathematical Models of typical components, systems and subsystems in frequency domain and time domain; State variable representations, controllability and observability. Time domain and frequency domain analysis and associated mathematical tools, Control system performance specifications: Transient and steady state, stability of systems. Routh Hurwitz, Lyapunov functions. Controller design: state feedback, compensators. Typical Case Studies Identification and control of Oven, Hydraulic position control in Rolling Mills. AC servo voltage stabilizer Design and analysis of control systems using MATLAB and SIMULINK.

ET/T/313 DIGITAL COMMUNICATION SYSTEMS

INTRODUCTION Pulse code modulation, aliasing, linear and non-linear quantization, calculation of quantization noise, Differential pulse code modulation, Delta modulation, Quantization noise in delta modulation, limitation of of delta modulation, Adaptive delta modulation, Delta signa modulation, MPEG audio coding standard. MULTIPLEXING Introduction, Frequency division multiplexing. Time division multiplexing (TDM): Synchronous: Characteristics, TDM link control, framing, pulse stuffing, synchronization: frame bit, Early-late bit synchronizner, Inter symbol interference, Eye pattern, Equalization - Nyquient criterion, fixed equalizers and decision directed equilizer, Statistical multiplexing. Introduction to code division multiplexing. DIGITAL MODULATION TECHNIQUES Introduction: Need for modulation, BPSK, DPSK, DEPSK, PSK, MARY PSK, QASK, FSK, MARY-FSK, Minimum shift keeping. Duobinary shift keeping. Partial response, Signaling. Introduction to spread spectrum communication. DATA TRANSMISSION A baseband signal receiver, Integrate dump type filtering, Calculation of probability of error, Optimum filtering, Matched filter, Probability of ever of matched filter,Transfer function and impulse response of matched filter, Design example, Prewriting filter, coherent reception, Probability eror calculation of PSF PSK etc. DECISION THEORY Signal space, Decision region and decision

boundary, Bay's likelihood ration and its interpretation, Bay's strategy for detection of single sample value. Maximum likelihood estimation, Minimax test, Neyman-Pearson test etc. INFORMATION THEORY AND CODING Discrete messages, measure of information, entropy, information rate, coding to increase average information rate, Shannon's theorem, channel capacity, capacity of gaussion channel, coding: Introduction, Parity check bit coding for error detection, Coding for error detection and correlation, Block codes, coding and decoding, Algebraic codes, Convolution code, Probability error calculation.

ET/T/314 ANTENNAS & PROPAGATION

Radiation, Herzian Dipole, different field components, Antenna Fundamentals, Application of Network Theorems, Basic Terminology. Field radiated by dipole & loop antennas, monopole antenna, effect of ground. Travelling Wave Antennas. Antenna Impedance & Bandwidth. Array Analysis & Synthesis, Special arrays like Binomical Yagi etc. Introduction to Adaptive & Retrodirective Arrays, Smart Antennas. Circularly Polarized Antennas, Helical Antennas Broadbend Antenas and Arrays (Log periodic & others) Secndary Source & Aperture Antenna. Microwave Antennas. Horn, Slot, Parabolodial Reflector, Lens & Microstrip Remote sensing application of antennas, Radar range equations. PROPAGATION Effect of Link on EM Wave propagation in Different frequency Ranges. Interference Effects of Ground, Antennas Located over Flat & Spherical Earth, Coverage Diagram, Surface wave propagation, Ionospheric propagation, Including Effects of Earths' Magnetic Fields. Tropspheric Scatter, Ducts & Nonstandard Refraction, ELF propagation using Earth-Inosphere Wageduide Model. Scattering & Absorption at Microwave Frequencies. Introduction to Propagation Modelling and Predictive studies on Propagation. Multipath fading. Friis transmission formula. Brightness & Antenna Temperature- their role in link calculation

ET/T/315 ANALOG CIRCUITS-II

1. MULTISTAGE AMPLIFIERS Frequency response of single stage R-C coupled amplifier, cascode amplifier, cascaded BJT and FET amplifiers, frequency response of R-C coupled multistage amplifier. 2. POWER AMPLIFIERS Analysis and design of class A, class B, class AB, class C,class D amplifiers, Design of heat sink,IC power amplifiers. 3. TUNED AMLPIFIERS Bandwidth consideration of tuned amplifiers, Analysis of single and double tuned amplifiers, Stagger tuning, Butter worth and Chebyshev response. 4. LINEAR WAVE SHAPING CIRCUITS RC high and low pass filter response for non sinusoidal signals, compensated attenauator, ringing circuit, measurement of L and C through circuit step response. 5. WAVEFORM GENERATOR oscillation criteria and oscillator circuits. Multivibrators, Blocking oscillator, Relaxation Oscillator, 555 timer as variable duty cycle square wave generator, Variable frequency LC and RC sine wave oscillators, Crystal oscillators. Linear time base circuits, PLL-architecture and applications, VCO architecture and applications, Synchronization and frequency division circuits. Bandwidth improvement with current feedback due to absence of Miller effect, the current mirror, current copier and current differentiating amplifier and their applications, Widler circuits. 6. SPECIALIZED LINEAR ICs

Multiplier (2208) IC, VCO, PLL, Balanced Modulators, Analog switches Track and hold circuits. 7. VOLTAGE REGULATOR Voltage feedback regulation, current limiting, series voltage regulator, three terminal IC regulators, switching regulators, switch mode power supply, regulators with thermal stabilization.

ET/T/316 COMPUTER ORGANIZATION AND ARCHITECTURE

Introduction, Brief history of Computers, Economic trends, underlying technologies, General organization of a digital computer, Computer functions, Interconnection Structure, Bus, Bus interconnection. Arthmetical Logic Unit: arithmetic and logic operations, arithmetic and logic operands, construction an airithmetic and logic unit, bit slice unit, IEEE standards for floating point number representation, truncation techniques. Processor organization, Register organization, the instruction cycle, Instruction Pipelining, Microoperations, Control of the Processor, Instruction sequencng, Formats and its interpreation, Microprogram concepts, Control unit design, CPU design. Semiconductor, magnetic and optical memories(Primary, Secondary and tertiary storage),memory organization, virtual memory, cache memory and interleaved memory, CD ROM ,Static and Dynamic ROM Interrupt, interrupt generation, interrupt handling and interrupt service routine, exception, Concepts of I/O organization, Data transfer methods, Programmed I/O, DMA, Interrupt based transfer, I/O chanels, I/O processors, Serial transmission and synchronization. Multiprogramming and time sharing, architecture classification, Parallel computers-classification Various terms associated with pipelining, pipelined data paths, pipelined control,pipeline hazards, pipeline implementations, instruction-level parallelism, Multiprocessors, Array processors, Vector processors. Books recommended: 1. W. Stalling, "Computer organization and Architecture, Fifth Edition" Prentice Hall 2000 2. Miles Murdocca, Vincent P.Heuring," Principles of Computer Architecture, First Edition"Engineering/Science/Mathematics 1999 3. Andrew S.Tanebaum,"Structured Computer Organization, Fourth Edition" Engineeering/Science/Mathematics 1998. 4. D.Patterson and J.Hennessy", Computer Organization and Design-The Hardware/Software", Morgan Kaufmann publishers, 1994 5. Hennessy, J.L. and patterson, DA(1990) Computer Architecture: A Quantitative Approach. Morgan Kaufmann. 6. Dasgupta, S.(1989)Computer Architecture. Volumes I and II. Wiley. 7. Hwang, K.(1993) Advanced Computer Archicture.McGraw-Hill. 8. Hennessy, J.L.and Patterson, DA(1994) Computer Organization and Design: The Hardware/Software Interface. Morgan Kaufmann. 9. Computer Architecture & Organization, McGraw-Hill, 2nd Edition. John Hayes. 10. Computer System Architecture PHI,3rd Edition, M.Morris Mano. 11. Computer Architecture And Parallel Processing, McGraw Hill Book Company. Hwang and Briggs. 12. Choudhuri P.P, Computer Organization and Design, Prentice Hall of India 13. Rao P.V.S, Perspectives in Computer Architecture, Prentice Hall of India. 14. Mano., Computer System Architecture, Prentics Hall of India 15. Murray W.Computer and Digital System Architecture, Prentice Hall of India 16. Tannebaum A., Computer System Architecture, Prentice Hall of India

ET/S/311 ANALOG CIRCUITS LABORATORY-II

Experiments related to " Analog Circuit-II".

ET/S/312 DIGITAL COMMUNICATION LABORATORY

Experiments related to " Digital Communication Systems".

ET/S/313 MICROPROCESSOR LABORATORY

Experiments related to " Microprocessors & Microcontrollers".

ET/S/314 CONTROL ENGINEERING LABORATORY

Experiments related to "Control Engineering".

Third Year Second Semester

ET/T/321 IC TECHNOLOGY & DESIGN

Introduction Discrete and Integrated Circuit; TTL,MOS and CMOS IC. PROCESS TECHNOLOGY Clean environment, wafer preparation, oxidation, diffusion, ion implantation, plasma etching and deposition, lithography, metallisation contact and interconnects, bipolar and CMOS processing. BASIC DEVICES Long channel MOS transistor equations; Large signal and small signal models; short channel and narrow channel effects; sub threshold region, SPICE Simulation models. ANALOG CMOS SUBCIRCUITS AND SYSTEMS MOS Switch, Active diode resistors and switched capacitor resistors; current sinks and sources, current mirrors and amplifiers, voltage and current references, differential amplifiers, cascade amplifiers; operational amplifiers; design of two-state and cascade op Amp. ANALOGUE CIRCUITS Comparators; Switched capacitor Amplifiers, Integrators, Filters; DAC and ADC circuits. MOS INVERTERS Definition and properties, MOS and CMOS inverter; VTC characteristics; Noise Margining Power consumption and Power delays product. BI CMOS CIRCUIT TECHNIQUE BI CMOS device and technology ; Basic analogue subcircuits.

ET/T/322 COMMUNICATION SWITCHING SYSTEMS

Introduction to voice & data communication system. Voice Switching: Circuit switching, stronger and limitation system Concentrator and expander, analog matrix switching. Contention free 3 stage matrix switching, stored programme control concept. Analog sampled switch with virtual path: sampling theorem PANTDM system, Resonant transfer method. Ti format, common channel signaling. Time slot interchange technique limitation. Digital space switching limitation, time space time switch. Distributed switching network and exchange hierarchial numbering system, EPABX. Traffic Engineering: Definition of traffic load, grade of service and other parameters, definition of Markov chain, probability distribution of arrival service and termination process, B-D process. Modelling of switching system, LCC, LCD delay systems. Erlang's formula. Data Network concepts: Introduction to message and packet switching, advantage of packet switching, design consideration, topology, media, routing, access techniques basics, examples of data networks. Multiple access technique methodology: FDMA,

TDMA, ALOHA, Slotted ALOHA, CSMA, persistent CSMA/CD, Token ring, Special access technique for mobile radio network. Spread spectrum basics, PN and FH sequence, CDMA techniques. Network protocols, 7 layers OSI architecture, Physical layer example RS232,Line coding, Data link layer ARQ techniques, Mobile communication basics.

ET/T/323 DIGITAL SIGNAL PROCESSING

Signal: Multichannel and multidimensional, continuous time, discrete-time, discrete-time sinusoidal-propertics. Sequences: Classification based on length, Symmetry, periodicity, energy, power, special sequences, arithmetic operations on sequences. LTI Systems: Convolution, Graphical & analytical techniques, overlap & add method, slidng tape method, numerical problems on LTI systems, properties of convolution and interconnection of LTI systems, stability of LTI systems, casual LTI systems, Recursive and Non-recursive systems, difference equation, implementation of systems, Direct form I and II structures, Moving average system. Z-Transform: Definition, mapping between s-plane and z-plane, unit circle, convergence and ROC, Z-transform on sequences, properties of Z-transform, Inverse Z-transform, numerical problems. DFT: DFT and IDFT relationship, Twiddle factor, linear transformations, basic properties, circular convolution, multiplication of DFTs, Linear filtering using DFT, filtering of long data sequences, overlap and save method, Efficient computation of DFT, FFT algorithms, Radix-2 algorithm, Decimation in-time and Decimation-in-frequency algorithms, signal flow graph, butterflies, Chirp-Z transform algorithm. Digital Filter Design: Design of FIR filter, linear phase, Windows-Rectangular, Berlitt, Hanning, Hamming & Blackman. Design of IIR filters from analog filters, Bilinear transformation, Butterworth, Chebyshev, Elliptic filters. Frequency transformations- in analog & digital domains, least-square methods, computer-Aided Design. MATLAB Application: Sequence generation, convolution of two finite-length sequences, impulse response computation, DFT and IDFT computations, Linear convolution via DFT, overlap and add method, computation of rational Z-transform. Typical DSP Hardware: Texas instruments family of DSP devices, TMS 320 C25 Board, Architecture, Supporting chips, Raxix-2 DIT FET Program using TMS 320320 Multirate DSP: Decimation by a factor D, interpolation by a factor I, sampling rate conversion, filter design and implementation, digital filter banks. Applications of DSP : DTMF signal detection, Musical sound processing, Digital FM stereo generation, oversampling A/D and and D/A converters.

Suggested Books:

1. Digital Signal Processing- Principles, Algorithms and Application- J.G.Proakis & D.G.Manolakis.
2. Discrete- Time Signal Processing-A.V.Openheim and R.W.Schafer.
3. Digital Signal Processing-A Computer based Approach-S.K.Mitra
4. A Practical Approach to Digital Signal Processing- K.Padmanabhan, S.Ananthi & R.Vijayarajeswaran

ET/T/324 DIGITAL CONTROL SYSTEMS

Benefits of Digital control: Representation of discrete systems: Z-transforms, Pulse transfer function, Sampling process and its frequency domain interpretation, Aliasing. Mapping s domain to z domain, bilinear transformation and frequency prewarping Discretisation of continuous system, Hold circuits, State variable representation. Time and Frequency domain analysis: Controller specification, Stability of sampled data systems, Jury's test and Liapunov's stability criterion Design of discrete controller: State feed back, Observers, Linear quadratic controller, and compensator design in w-domain. Implementation of digital controllers: Effect of finite bits,quanization erros,overflow Series, parallel and cascade realization of digital controllers Word length requirements of ADC and CPU for a given controller function and prescribed noise figure Case studies: Position control of an antenna dish, Read Write Head of Computer Hard drive, and Twin Rotor Multi Input Multi output system Design and analysis of control systems using MATLAB and SIMULINK

ET/T/325 SYSTEMS SOFTWARE

Assemblers: Basic functions of assemblers, Design of one-pass and multi-pass assemblers, Cross-assemblers, MASM. Loaders and linkers: Absolute loaders, Subroutine-linkage, Relocating loaders, Direct linking loaders, Binders, Linking loaders, Overlays, Dynamic binders. Compliers: Different phases - lexical analysis, syntax analysis, intermediate code generation; Introduction to code generation and optimization, interpreters, compiler-compilers-YACC. Operating systems: Extended M/C view of an operating system, Operating system as an user interface, Operating system as a resource manager, Features of processor management module, memory management module, device management module and information management module, Case studies -UNIX, WINDOWS. Introduction to Text-editors and Debuggers.

ET/S/321 MICROELECTRONICS AND VLSI LABORATORY

Experiments related to " IC Technology and Design".

ET/S/322 COMMUNICATION SWITCHING LABORATORY

Experiments related to " Communication Switching Systems".

ET/S/323 DIGITAL SIGNAL PROCESSING LABORATORY

Experiments related to " Digital Signal Processing".

ET/S/324 DIGITAL CONTROL LABORATORY

Experiments related to " Digital Control Systems".

Fourth Year First Semester

ET/T/411 COMPUTER COMMUNICATION NETWORKS

Introduction of Computer Networks and Data Communication Services. Roles of Network Hardware and structured Network software. The Reference Models: OSI, TCP/IP. Mention of Physical layers and significance of circuit switching, packet switching, message switching, and ISDN services. ATM and transmission in ATM network, Advanced mobile phone system (AMPS). Concept of global system for mobile communication (GSM), satellite and fiber optic networks. Design of data link layer, data link protocol, framing, error and flow control.Error detection and correction. Example of data link protocol. The multi-access channel, multiple access protocols, wireless LAN protocols, IEEE standards. Network layers, its internal organization, routing alogorithms, hierarchical routing, routing for mobile hosts, cogestion control algorithms. The network layer in Internet, the IP protocol/addresses/header. The network layer in ATM networks. Transport layer services, Internet transport protocols, the ATM AAL layer protocols, protocols for Gigabit networks. Network security concepts. The Electronic Mail, Email gateways, the World Wide Web, Multimedia concepts.

ET/T/412 OPTICAL FIBER COMMUNICATION

Fiber optic communication principle for analog and digital signals. Passive and Active components for fiber optic communication: (a) Different optical fiber types, their wave guidance properities, alternation, dispersion and other characteristics. (b) Manufacturing principles of optical fibers, measurement of optical fiber parameters. (c) Passive fiber optic components: couplers, switches, gratings, optical connectors, optical filters, WDM filter, Bragg reflectors, optical isolators, optical circulators, Alternators etc. (d) Active components: Semiconductor LED,Laser divdes, Fibre amplifiers, PIN & Avalanche photodiode. Fiber optic Transmitters: For short hand and long hand communications, Fiber optic receivers, Repeaters for long hand communication, High bit rate digital optical communication systems. Use of WDM technology for high capacity system design Broadband fiber optic communication systems Analog Video transmission in CATV networks. Fiber optic networks: FDDI principles, LAN,MAN,WAN,B-ISDN using fiber optic technology. New hands in Fiber optic technology and their application to Fiber optic communication.

ET/T/413 OPERATING SYSTEMS

Hierarchical and extended machine view. PROCESSOR MANAGEMENT: State model, job scheduling, process scheduling, multi-processor scheduling, process synchronization, deadlock problem. MEMORY MANAGEMENT : Single contiguous allocation, partitioned allocation, paging, segmentation, demand paged memory management. DEVICE MANAGEMENT : Dedicated, shared and virtual devices, channels and I/O control units, device allocation, I/O traffic controller, I/O scheduler. INFORMATION MANAGEMENT: File systems, allocation, strategy, recovery of files. Introduction to the distributed operating systems. Case study :DOS, UNIX, LINUX WINDOWS etc.

ET/T/414 VLSI DESIGN

Review of MOSFET characteristics, scaling and small-geometry effects, MOSFET capacitances. MOS inverters, CMOS inverter, static characteristics, switching characteristics, power dissipation issues. Combinational MOS Logic Circuits: MOS logic circuits with depletion loads, CMOS logic gates, complex logic gates, CMOS transmission gates, psudo-nMOS domino logic gates, complex logic gates, CMOS transmission gates, pseudo-nMOS, domino logic gates. Multilevel gate circuits and design. Sequential MOS Logic Circuits: The SR latch circuit, clocked latch and flip-flop, CMOS D-latch and edge triggered circuits, Schmitt trigger circuit. Dynamic Logic Circuits: Pass transistor logic, synchronous dynamic circuit techniques, high-performance dynamic CMOS circuits. Semiconductor Memories: ROM circuits, SRAM circuits, DRAM circuits, drivers and buffers, design issues in memory and array structures. Low-Power CMOS Logic Circuits: Overview of power consumption, low-power design issues in memory and array structures. Low-Power CMOS Logic Circuits: Overview of power consumption, low-power design through voltage scaling, estimation and optimization of switching activity, quasi-adiabatic logic circuits, Multi-threshold CMOS,SOI-MOSFET design issues. BiCMOS Logic Circuits: Basic BiCMOS circuits, static behavior, switching characteristics in BiCMOS logic circuits, BICMOS applications. Input-Output Circuits: ESD protection, input and output buffer design, on-chip clock generation and distribution, latch-up and its prevention.

Books:

CMOS Digital Integrated Circuits, S.M.Kang and Y.Leblebici.
VLSI Design Techniques for Analog and Digital Circuits, R.L.Geiger, P.E.Allen and N.R.Strader.
Digital Integrated Circuits, J.M. Rebaey. Introduction to Digital Systems, M.Ercegovac, T.Land and J.H. Moreno.

ET/T/415 MICROWAVE ENGINEERING

Basic Microwave Concepts, Crequency Bands, Transmission Line Analogy of Waveguides, General approach to Microwave circuit Analysis, Losses & Discontinuities in Rectangular and Circular Waveguides, Resonatons, waveguide Matching components, Inductive, Capacitive & Resonant Windows, Screws, Posts etc., Magic Tee, Hybrid Ring, Corners, Bends & Twists, Phase shifte, Directional Couplers characterization of Ferrites, Ferrite Devices e.g. Circulator, Isolator etc., Scattering Matrix Representation of Microwave Components, Introduction to Microwave Filters. MIC and MMICs, Microstrips & Stripline components & Transmission Lines. Microwave Sources: Different Types. Limitations of conventional sources in Microwave Frequency Range. Klystron- 2 Cavity & Multicavity, Refle Klystron, Magnetrons, Periodic Structures, Floquets' Theorem, Helix TWT. Transfer Electron Devices, Gunn Oscillators, IMPATT Devices, Microwave Transistors & FET, PIN Diode Single Stage Microwave Amplifier Design. Microwave Measurement Fundamentals Frequency, Impedance and Power Measurement, Noise Figure Measurement, Antenna Measurements, Principle of Operation of Network Analyzer.

ET/T/416 ELECTIVE-I

1. ELECTRON DEVICE III
2. ELECTRONIC DESIGN AUTOMATION
3. AUDIO/VIDEO ELECTRONICS & BROADCASTING
4. SOFTWARE ENGINEERING
5. PRINCIPLES OF ELECTROMAGNETIC COMPATIBILITY
6. NEURO FUZZY CONTROL
7. RADAR & NAVIGATION

ET/T/416A ELECTRON DEVICE III

Optoelectronic and Display Devices: Photomultiplier tubes, photoconductive & photovoltaic cells, photodiode, avalanche photodiode, photo-Darlington and photoFET, Light emitting diodes, seven segment display, Dynamic scattering and field-effect LCD: operation & electrical characteristics, Gas discharge displays, Laser diodes, optoelectronic couplers.
High Frequncy Devices : p-I-n diode, IMPATT, TRAPATT, Gunn diode, Metal semiconductor field effect transistor (MESFET).
Miscellaneous Devices: Thermistor, VVC diodes, Lambda diodes, Transferred electron devices.
Quantum devices: Concept of quantum well and quantum confinement, Quantum wires and Quantum dots, Band gap engineering,, Heterostructures, Superlattice, High electron mobility transistor (HEMT), Heterojunction bipolar transistor (HBT), Resonant tunneling diode (RTD).

ET/T/416B ELECTRONIC DESIGN AUTOMATION

PROCESS STEPS IN IC FABRICATION
NMOS, PMOS, CMOS and BICMOS processes.
Device physics and models.
Device physics of BJT and MOSFET. Short channel and hot electron effects.
LDD and LDS structures, BJT models, Ebers-Moll and Gummel-Poon models, MOSFET models, Simple (Sah) model, BSIM and CSIM models, Small signal models of BJT and MOSFET, Model parameters, Device scaling.
IC DESIGN
Design considerations for CMOS gates, Bipolar and CMOS RAM, ROM.
Transmission lines. Hierarchical design, Procedural, structural and behavioural design, Standard cell and gate array design, Top down and bottom up approaches.
SIMULATION
DC, AC and transient solutions, Delay analysis, Timing considerations, SPICE simulation, Parameter extraction, Optimization considerations with illustrative examples.

ET/T/416C AUDIO/VIDEO ELECTRONICS & BROADCASTING

Audio Fundamentals, Acoustical system and its electrical equivalent circuits, Loudspeakers, Microphones, Studio acoustics, Sound recording and reproduction, high fidelity stereophonic systems, multichannel audio, Digital audio, Analog-to-digital Conversion, audio compact disc. IC chips for audio applications, Video Fundamentals, Picture elements, Black and white pictures. BW consideration, scanning, synchronization, Composite video signal Camera Tubes and Picture Tubes, Fundamentals of Color TV , Color Camera, Color picture Tubes, Chromatic Circuits, AM Transmitter, Master oscillator, Buffer frequency multiplier, Low and high level modulation systems, feeder lines. FM transmitter-block diagrams & elementary principles. TV Transmitters Programme Control room, Video Switches Master Control room Vestigital sideband transmission, Transmitting antenna, superheterodyne receivers, details of TV receiver stages, video amplification- methods of compensation, d.c. restoration. Receiving antenna, digital recording, digital multimedia, data compression, audio/video compact disc.

ET/T/416D SOFTWARE ENGINEERING

Introduction; Software life-cycle models; software requirements analysis and specification; Data-flow-oriented design, Data-structure-oriented design and object-oriented design; Coding, unit testing, integration, Validation and system testing; Software project planning, monitoring, maintenance and quality control. Software reliability and fault tolerance. Computer aided software engineering (CASE).

ET/T/416E PRINCIPLES OF ELECTROMAGNETIC COMPATIBILITY

1. Introduction

1.1 Causes of EMI 1.2 EMI effects 1.3 EMC practices

2. Sources of Conducted Interference and its Characteristics

2.1 Non-functional sources: Commutators, Heater circuits. Fluorescent Lamps, Static Power Devices, Automatic sources.

2.2 Functional Sources.

2.3 The conducted Spectrum.

3. Characteristics of Interference

3.1. Bandwidth

3.1.1 Narrowband Interference

3.1.2 Broadband Interference

3.2 Amplitude Behaviour

3.2.1 Thermal Noise

3.2.2 Impulsive Noise

3.3 Design Practice for Minimizing Conducted Interference

3.3.1 Noise Source Treatment

3.3.2 Modes of Operation

3.3.3 Tube Design

3.3.4 Arc Discharge

3.3.5 Sensitive Device treatment

4. Sources of Radiated Interference and its Characteristics

4.1 Nature of Sources of radiated Interference.
4.1.1 Non-Functional Sources
4.1.2 Functional Sources.
5. Interference Coupling by Conduction and Radiation
5.1 Coupling via conductive Patches.
5.1.1 Resistive transfer
5.1.2 Inductive and Capacitive Transfer.
6. Grounding Bonding, Shielding and Filtering
7.Materials and Special Devices
6. Mathematical Models for Sources Coupling and Susceptors

ET/T/416F NEURO-FUZZY CONTROL

Basics of fuzzy sets: Classical set to Fuzzy Set, Operations on fuzzy Set, Membership functions, Extension principle, Fuzzy arithmetic, Fuzzy logic and approximate reasoning, Fuzzy logic based control system: its relationship to conventional control systems, fuzzifier, Fuzzy rule base, Defuzzifier, Inference Engine, Mamdani and Sugeno scheme. Design Methodology of Fuzzy control systems, Stability analysis and applications. Introduction to Neural Nets, Common types of Neural nets, Feed forward, Hoffield Learning of neural nets: Supervised and unsupervised learning, back propagation learning.
Adaptive controller using neural nets, Neuro-Fuzzy adaptive control.

ET/T/416G RADAR & NAVIGATION

RADAR
Basic Radar, Radar Equation, Threshold Detection, Integration of Radar Pulses, system Losses, Effects of RCS Fluctuation, Internal and External Noise. MTI and Pulse Doppler Radars, Range and Speed Ambiguities, Doppler Filter Banks, Digital MTI Processing, MTD, Limitations to MTI performance.
Tracking Radars: Sequential Lobing, Conical Scan and Monopolse, ADT.
Matcherd Filter Receiver, Detection Criteria, Automatic Detection, Detectors & Integrators, CFAR.
Target Recognition: SAR & ISAR.

NAVIGATION
Guidance and Navigation, Categories of Navigation. Navigation Equations, Co-ordinate Frame, Dead Reckoning computations, positioning, Terrain matching Navigation, Course computation, Navigation Errors.
Inertial Navigation: Instruments, Platforms, Mechanization Equations, Error Analysis & Fundamental Limits.
Satellite Navigation: Ranging Equations, Range Rate Equations and Clock Errors, NAVSTAR GPS: Principles, coverage, configuration, Control & Signal Structure, DGPS, GPS Accuracy; GLONASS, combined GPS/GLONASS. Multisensor Navigation, Flittering of Measurements, Kalman Filter.

ET/S/411 COMPUTER ARCHITECTURE AND SYSTEM SOFTWARE LABORATORY

Experiments related to "Computer Organization and Architecture" and "System Software".

ET/S/412 MICROWAVE LABORATORY

Experiments related to " Microwave Engineering".

ET/S/413 COMMUNICATION NETWORKS LABORATORY

Experiments related to" Computer Communication Networks".

ET/S/414 PROJECT

Specific project will be assigned by the teachers concerned.

Fourth Year Second Semester

MNG/ME/T/1 INDUSTRIAL MANAGEMENT

Growth of Industries, Management thoughts and scientific management, Taylorism; Factory system of production, Introduction to management problems, Types of manufacture, Planning analysis and control aspects in industries.
Types of business ownership, means of finance and business combinations, organization structures, committee organization, authority and responsibility, duty and span of control. Plant location, factory buildings and physical facilities, plant layout, tools and techniques of plant layout, materials - handling arrangements. Product development, standardization, simplification and diversification.
Functions of production, planning and control, production forecasting, production scheduling and network techniques, Gantt chart, CPM, PERT etc.
Work study, job evaluation and merit rating; purchase system and inventory control. Inspection and quality control of systems, statistical quality control, maintenance and replacement policies for machine and equipments; decision making theories, breakeven analysis cost benefit analysis, evaluation of financial and managerial efficiencies. Introduction to operational research techniques. Application of fuzzy logic in modern management concepts. Human relations in industry and labour compensation. Personnel management, provision of industrial legislations in India. Wage and salary administrations. Welfare and safety provisions, trade union acts. Study of environmental impacts and environmental laws.

Text Book:
Production and operations management: S.N.Chari

Reference books:

1. " Industrial Management" by: Basu & Majmundar (Birla Pub., Newdelhi)
2. " Quantitative techniques in management" by: N.D.Vohra (Tata Mcgraw Hill)
3. "Production systems analysis and control" by : Riggs
4. "Works organization and management by: Basu, Sahoo & Dutta.
5. Fuzzy logic with Engineering applications: Timothy J. Ross (Mcgraw Hill)

ET/T/422 SATELLITE, MOBILE & PERSONAL COMMUNICATION

SATELLITE COMMUNICATION

Historical development of statellites Indian-activities in statellite communication satellite system, Earth Station: The Antenna, High power amplifier, Low noise amplifier, VP connector, Down converters, conversion process, redundancy configuration. Statellite transponder, Transponder model, Channelisation, Frequency plans, Processing. Synchronous statellite communication relay by synchronous statellite, statin keeping altitude stablisation, power generation, solar celifore, statellite earth terminal mutual interference, Communication link design & transponder. Frequency division multiple access principle, SPADE,FDM-FM-FDM. Time division multiple access principles, TDMA frame structure, super frame structure, Frame acquition and synchronization. DSCDMA, D.S. spread spectrum system.

MOBILE AND PERSONAL COMMUNICATION SYSTEM

Introduction : Concept of mobile and personal communication -Past present and future, System requirement, Some related network concept, Celluler concept : Basic principles and concept, Multiple access technologies, System operation and planning, System architecture, Location updating and call set up -registration, terminal authentication, Hand off and Power control. Analog Celluler System- AMPS (Advanced Mobile Phone System), TACS (Total Access Communication Systems), NMT (Nordic Mobile Telephone), NTT (Nippon Telephone and Telegraph). DIGITAL CELLULAR MOBILE SYSTEM Introduction, GSM(Global System for mobile communication)- digital standardization and services, Architecture and function partitioning, Radio aspects, Security, Protocol model, Typical call flow sequences, DECT- (Digital enhanced cordless tele communication), Introduction, Radio aspects, Layerd architecture, Network aspect, DECT/GSM internetworking. PERSONAL MOBILITY AND UNIVERSAL PERSONAL TELECOMMUNICATION (UPT) Introduction, UPT- Concept and services, Service Profile and parameters, functional architecture for UPT, Numbering, Routing and billing aspects, Access Security requirement.

ET/T/423 INSTRUMENTATION AND MEASUREMENTS

Errors in measurement: Absolute and relative, Observer error, Accuracy, precision and Resolution, systemic and random errors Transducers: Static and dynamic specificatio; Transducer for: Position-Potentiometers., LVDT, Optical Encoders, Syncros, Resolvers Force: Strain Gage, Load cell, piezoelectric Velocity: Tachogenerators; Fluid : Pressure, flow, level transducers. Bourdon tubes, Bellows; Temperature: Thermocouple, Resistive Temperature detectors (RTD) Thermistors. Vacuum: Pirani gauge; Optical coupling and

isolation, LED, Humidity transducers, Analog Volt-ohm-milliammeter DC Potentiometer, Calibration of DC Ammeter/Voltmeter by Potentiometer Low/High resistance measurement Emitter follower voltmeter, FET input voltmeter AC Mill voltmeter, peak response Voltmeter. True RMS meter, Digital Meters: Readouts, LED,LCD, Display drivers, Digital frequency meters, Measurment of time period, Pulse width and frequency ratio, Digital Voltmeter, LCR meter, Measurement with CRO: Voltage, frequency and Phase, Oscilloscope probes. Displaying diode characteristic on CRO; sampling oscilloscope, Principles of Digital storage Oscilloscope Instrumentation amplifier, Chopper stabilized DC amplifier, Data acquisition card Measurement of Flow and Liquid Level Head flow meters, Area flow meters, Mass flow meters, and Magnetic flow meter, Measurement of airflow. Capacitance type and photoelectric level detectors. Electronic measurement of power & energy. Data acquisition Toolbox under MATLAB

Book:

Electronic Instrumentation and measurement by David A.Bell, Reston Publishing Co Inc, :Prentice-Hall Co.

ET/T/424 INDUSTRIAL ELECTRONICS

Rectifiers: (a) Three phase Half wave, Full wave, Bridge and Double Y-type with interphase reactor. Behaviour of circuit with flywheel diode. Regulated Power supply, SMPS
Silicon Controlled rectifier: Single phase, Polyphase; Triggering Circuits. UJT, DIAC, application in DC motor control; PLC;TRIAC, Typical applications
Power FET, Inventers using SCRs,UPS
Industrial timer circuits; Resistance welding and its control
Induction and Dielectric heating. Magnetic Amplifier and Transconductors

ET/T/425 ELECTIVE-II

1. OPTIMAL & ADAPTIVE CONTROL
2. COMMUNICATION NETWORK MANAGEMENT
3. OPTICAL NETWORKS
4. ADVANCED MOBILE COMMUNICATION
5. MONOLITHIC MICROWAVE INTEGRATED CIRCUITS
6. DISTRIBUTED SYSTEMS
7. COMPILER DESIGN
8. EMBEDDED SYSTEMS

ET/T/425A OPTIMAL AND ADAPTIVE CONTROL

Introduction to optimal control
Performance measure for optimal control problems, the principle of optimality, Concept of dynamic programming, The Hamilton-Jacobi-Bellman Equation

The calculus of variation
Fundamental of a single function, Functionals involving several independent functions, Constrained minimization of functionals.
The variational approach to Optimal Control problems
Linear regulator problems, Potryagin's minimum principle and state inequality constraints, minimum time and minimum control-effort problems.
Estimation techniques, least mean square, Maximum likelihood.
Adaptive control systems, Model reference approach for controller design. Neuro-Fuzzy adaptive control Design and analysis of controller using MATLAB and SIMULINK

ET/T/425B COMMUNICATION NETWORK MANAGEMENT

Overview of Telephone and Data Communication networks & topologies.
Network controllers, Internet configuration, Internet Fabric Model.
Overview of gateway communication & subnetworks
Common Network Problems
Network management systems (NMS), principle and functions
Network management standards, Network management model: Organization
Model information model and its structure (ASN-I)
Simple network management (SNMP-version I) SNMP communication model,
Access policy & protocol, SNMP-Macro, SNMP operations.
The information Model: Management information base (MIB) module;
Example. The IP Group, IP routing and forwarding; ICMP and TCP groups, An SNMP MIB group.
The SNMP-version 2 its structure.
SNMP management: Remote Monitoring (RMON) RMON SMI and MIB;
ATM RMON MIB; A case study of Internet traffic using RMON
Broad band multimedia service: ATM SONET;HFC;ADSL WAN, Mobile & Broadband Access Service, Principle of Broadband Network Management, Management of ATM LAN
TMN-Model & its relationship to data & Telecom Networks: TMN- Standards, Services, Functions & Architecture.
Network Management Tools: For trouble shooting of problems; Bit error rate Trested, Protocol Analyzer, Traffic load Monitor etc.
Global view of Network, Network Management Applications. Web-based Network Management.

ET/T/425C OPTICAL NETWORKS

Introduction; Review of Optical Technology – propagation of signals in optical fiber, components, modulation and demodulation, transmission system engineering; Generations of optical networks, SONET/SDH, computer interconnects, Metropolitan-Area-Networks, layered architectures; Broadcast and select networks – topologies, Media-Access Control (MAC) protocols; Wavelength Routing networks- the optical layer, node designs, network design and operation; Routing and wavelength assignment

(RWA) problems; virtual topology design; control and management; photonic packet switching.

ET/T/425D ADVANCED MOBILE COMMUNICATION

INTRODUCTION

- Why Wireless Mobile communication
- Location dependent services
- Mobile and Wireless devices
- History of wireless communication
- A simple reference model

WIRELESS TRANSMISSION

- Frequencies for for Radio Transmission
- Regulations act
- Modulation used
- Direct Sequence Spread Spectrum
- Frequency Hopping spread spectrum

CELLULAR SYSTEMS

- Cellular networks
- Frequency reuse
- GSM and its services
- GSM Architecture
- Protocol Architecture of GSM

MOBILE TRACKING

- Location updates and paging
- Handover
- Security
- Authentication/Encryption

NEW DATA SERVICES

- GPRS
- DECT
- UMTS and IMT-2000

WIRELESS LAN

- Overview
- Advantages/Disadvantages

- IEEE802.11
- Protocol/Architecture
- Roaming

MOBILE NETWORK LAYER

- Mobile IP: Goals
- Entities and terminology in MIP
- IP Packet delivery
- Agent advertisement and discovery
- Registration
- Tunneling:Encapsulation
- Reverse Tunneling
- Routing

ET/T/425E MONOLITHIC MICROWAVE INTEGRATED CIRCUITS

Introduction
Why MMICS? Processing, MMIC performance, MMIC status, GaAs MMIC reliability, Yield cost, Future developments, MMIC applications: Military, Commercial and Consumer applications.

Network Parameters
Z,Y and h parameters, Properties of S parameters, Relationship between s-parameters and other parameters.

Noise Parameters
Thermal noise, Shot noise in two-port network, Noise figure and Smith chart, Noise temperature. Noise figure and noise voltage.

Device Modelling
Single-Gate FET, Basic operation, Device performance analysis, Characterization, Equivalent circuits and parameter extraction, Device modeling, Design considerations and applications, Noise modeling.
Dual-Gate FET, dc characterization and basic device operation, High frequency lumped element equivalent circuit, Applications of dual gate FETs.
Schottky Diodes, basic operation, Lumped element equivalent circuit, Semi-distributed element equivalent circuit, Applications and layout considerations.
Planer Lumped Elements, Planer capacitors, Planer resistors.
Transmission Lines, Microstrip and coplanar lines for MMIC's Line discontinuities.
MMIC Design Considerations and Amplifier Design, Design consideration for MMICs, Chip size, Thermal design and wafer thickness, Low-inductance grounds and crosseovers, Propagation modes and other design considerations.

Biasing Techniques

Microwave Amplifier Design, Design considerations, Procedure for general design of an amplifier, Design examples, 2-18 GHz distributed amplifier, 2-6 GHz feedback gain module, Low-Noise amplifier design, Circuit performance, Combining techniques for power amplifiers.
On-Chip Tuning, Tuning techniques using addition of elements. Airbridge removal technique.
MMIC Design, Nonlinear and control circuits mixer circuit design, Linearization, Device models, Distributed mixer design.
Phase Shiffer Design, Design approach, Design examples, Conclusion. Double and Single Balanced Mixer Design.
Variable Attenuator and Switch Design.
Nonlinear FET Operation and Selection, Variable Attenuator Design Measurement Versus Simulation.

ET/T/425F DISTRIBUTED SYSTEMS

Concept of Distributed Systems: Definition, Enslow's model, Motivation and Objectives, Application areas.
Inter Process Communication : Building Blocks, Client Server Communication, Case Studies.
Remote Procedure Call (RPC) : Design Issues and Implementation, Case Studies – SUN, ANSA, Asynchronous RPC.
Distributed Operating System : Kernel definition of Process and Threads, Naming and Protection, Communication and Invocation, File Server, SNS Name Service Model.
Timing and Coordination : Synchronization, Physical Clocks, Concept of Logical Time and Logical Clocks, Distributed Coordination.
Replication : Basic Architectural Model, Consistency and Request Ordering, Gossip Architecture, Process Group and ISIS.
Shared Data Transaction : Conversation between Client and Server, Simple Distributed Transaction and Nested Transactions, Automatic Commit Protocol, Concurrency Control, Distributed Deadlocks, Transactions with replicated data.
Recovery and Fault Tolerance : Transaction Recovery, Hierarchical and Group Masking of Faults, Security Issues.
BOOK : George Coulouris , Jean Dollimore and Tim KinDberg , " Distributed Systems Concept and Design", Addison-Wesley, 1994.

ET/T/425G COMPILER DESIGN

The Structure of a Compiler Lexical Analyzer : Regular expression, Finite Automata, NFA, DFA, Minimizing the number of states of a DFA, Implementation issues, Introduction to LEX.
Syntactic specification of a programming language, Context-free grammar, Derivation and Parse trees, ambiguity.
Basic Parsing Techniques: Shift Reduce parsing, Operator-Precedence parsing.
Top Down parsing, LL(1) parsers.

Bootom up Parsing, LR parsers, LR(0) items, construction of SLR parsing table. Introduction canonical LR parsing, LALR parsing table. Use of ambiguous grammars for LR parser implementation. Introduction to YACC.
Syntax Directed Translation , Intermediate code, Postfix notation, Three address codes – quadruples and triples. Translation of assignment statement, Boolean expressions, control structures, arrays.
Run-Time Storage Administration and Symbol Table Management
Data-Flow Analysis , Code Optimizations .

BOOK :

V. Aho and J. D. Ullman, “Principle of Compiler Design”, Addison-Wesley/Narosa Publishing House.

ET/T/425H EMBEDDED SYSTEMS

Introduction; architecture; specifications; design methodologies; real time issues-modeling, specification, communication, scheduling, protocols etc; Hardware-software co-design, approached to software and code generation, memory and low power issues, validation approaches; distributed embedded systems.

ET/T/426 GENERAL VIVA-VOCE

Based on the theory and sessional subjects of B.E.T.C.E course.

ET/S/421 INDUSTRIAL ELECTRONICS LABORATORY

Experiments related to " Industrial Electronics".

ET/S/422 SEMINAR

Seminar on some current topic in electronics and telecommunication engineering.

ET/S/423 PROJECT

Specific project will be assigned by the teachers concerned.