

SYLLABUS FOR 98-02 ECE BATCH FROM THIRD TO EIGHTH SEMESTER

341. MATHEMATICS III

UNIT I:

LAPLACE TRANSFORMS:

Definition -transform of standard functions -properties-transform of derivatives & integrals -transforms of the type $t(f(t))$ & $(f(t))/t$ inverse Laplace transform -convolution theorem transform of periodic functions-unit step function-unit impulse function - application of integral equations - simultaneous linear equations with constant coefficients.

UNIT II :

Z- TRANSFORMS:

Definition- properties-standard Z-transforms- shifting theorem initial & final value theorem- convolution theorem-inverse Z-transform- applications to solve difference equations.

UNIT III:

COMPLEX VARIABLES:

Analytical functions -necessary & sufficient conditions for $f(z)$ to be analytical -C-R-equations in polar co -ordinates-harmonic functions-orthogonal systems-construction of an analytical function given real or imaginary parts-application to flow problems- conformal transformation like $Z+C, CZ, I/Z, \sinh z, \cosh z, z^{2+1/k}$ & bilinear transformation.

UNIT IV:

COMPLEX INTERGRATION :

CAUCHY'S-integral theorem,integral formula -taylors & laurents series (with out proof)-singularities residues -calculus of residues -evaluations of definite integrals.

UNIT V:

STATISTICS:

TEST OF HYPOTHESIS :

Level of significance -TYPE-I & TYPE -II Errors-critical value test statistic - large sample tests-mean-differences of mean proportion-difference of proportion-S.D. small sample tests based on t, F, χ -square distributions.

TEXT BOOKS:

1. Dr. M.K. VENKATRAMAN Engineering Mathematics: Third-year part A , National publishing company, Chennai-1995.

2. P. KANDASAMY, K. THILGAVATHY K. GUNAVATHY-Engineering Mathematics vol II (Third Sem), S. CHAND & COMPANY LTD. NEW DELHI, 1996.

REFERENCE BOOKS:

1. ERVIN KREYSZIG- ADVANCED ENGINEERING MATHEMATICS, Wiley Eastern Ltd., 1983.

2. Dr. B.S. GREVAL-Higher engineering mathematics, Khanna publishers. 1997.

3. S. NARAYANAN, T.K. MANICKAVASAGAM PILLAI & Dr. G. RAMANAIH-ADVANCED MATHEMATICS FOR ENGINEERING STUDENTS VOL I, VISHVANATH (P) LTD, CHENNAI, 1998.

4. JOHN E. FREUND-Mathematical statistics, 5/e Prentice-hall of India Pvt Ltd. New Delhi, 1994.

342.ELECTRON DEVICES

UNIT I:

ELECTRON BALLISTICS:

Motion of charged particles in electric, magnetic & combined electric & magnetic fields- parallel & perpendicular E & H Fields-Applications - electric & magnetic deflection of beam in CRO-deflection sensitivity-focussing of electron beam in CRO.

UNIT II:

SEMICONDUCTOR THEORY & PN JUNCTION DIODES:

Review of intrinsic & extrinsic semiconductors- classical theory & energy band theory -charge densities in semiconductors- mobility & conductivity - drift & diffusion currents.

Construction of PN junction diodes- VI characteristics- quantitative theory of PN diode current components-diode resistances-transition & diffusion capacitances-effect of temperature on diode characteristics- model of diode - diode specifications-Clipping & Clamping Circuits- Voltage multipliers Using diodes.

UNIT III:

BIPOLAR JUNCTION TRANSISTORS:

Construction of transistor -principle of transistor action - current components -input & output characteristics of a transistor in CE,CB,CC configurations- cut off ,active saturation & breakdown regions - current gain in CE, CB, CC Configurations.- h parameter model for BJT.-BJT specifications.

UNIT IV :

FET & UJT:

Construction & characteristics of JFET -parameters of JFET -MOSFET -depletion & enhancement modes-FET in CS,CD,CG Configurations-equivalent circuit of FET at low frequencies-FET model at high frequencies-FET Specifications. Construction, theory of operation & characteristics of UJT, PUT.

UNIT V:

SPECIAL SEMICONDUCTOR DEVICES :

Fabrication & characteristics of zener diode, tunnel diode- PIN diode -varactor diode.

Construction & characteristics of SCR-two transistor equivalent circuit - applications-TRIAC & DIAC,-LASCR-CCD.Photodiodes- photoconductive cell & photovoltaic cellconstruction & working of LED & LCD - phototransistors-solarcell-optocouplers.

TEXT BOOKS:

- 1.SALIVAHANAN & OTHERS - ELECTRON DEVICES & CIRCUITS, TMH,1998.
- 2.MILLMAN & HALKIAS, "ELECTRONIC DEVICES & CIRCUITS",TATA MCGRAW HILL,1995.

REFERENCE BOOKS:

- 1.DAVID.A.BELL, "ELECTRONIC DEVICES & CIRCUITS ",PHI,1998.
- 2.ROBERT BOYLESTAD, "ELECTRONIC DEVICES & CIRCUIT THEORY",SIXTH EDITION,PHI,1998.
- 3.BOGART, "ELECTRONIC DEVICES & CIRCUITS",UNIVERSAL BOOK STALL, NEW DELHI,1994.

343. DIGITAL SYSTEMS

UNIT I:

NUMBER SYSTEMS & BOOLEAN ALGEBRA:

Review of binary, octal, & hexadecimal numbers systems - representation of signed numbers - floating point number representation - BCD - ASCII - EBCDIC - Excess 3 codes - Gray code - Error detecting and correcting codes.

Boolean Algebra :

Postulates & theorems - canonical forms - Simplification of Logic functions using Karnaugh Map - Quine Mcclusky method.

UNIT II

COMBINATIONAL LOGIC DESIGN:

Logic gates - implementation of combinational logic functions encoders & decoders - multiplexers and demultiplexers - code converters - half adder, full adder - parallel adder - binary adder - parity generator / checker - implementation of logical functions using multiplexers.

UNIT III

COUNTERS & REGISTERS:

RS, JK, JK Master - Slave, D & T Flip flops - Level triggering and Edge Triggering - Excitation tables - Asynchronous and synchronous Counters - Modulus Counters - Shift Register - Ring Counter - Timing Waveforms.

UNIT IV

SEQUENTIAL LOGIC DESIGN:

Basic models of sequential machines - Concept of state - state diagram - state reduction through partitioning and implementation of synchronous sequential circuits - Introduction to Asynchronous Sequential Logic Design.

UNIT V

Fabrication of Monolithic IC's - Characteristics of Digital ICS - TTL, ECL, MOS and CMOS digital IC families - Characteristics - Comparison of Performances - Interfacing TTL and CMOS ICs - Display Drivers. Basic Concepts of Programmable Logic - PROM - EPROM - PAL - PLA - FPGA - Implementation of digital functions.

TEXT BOOKS:

1. Morris Mano : "Digital Design" - Prentice Hall of INDIA, 1995.
2. V.K.PURI - Digital Electronics, TMH, 1997.

REFERENCE BOOKS:

1. Tocci, R.J : "Digital systems - Principles & Applications" - Prentice Hall of INDIA, 1997.
2. Fletcher, W.I : "An Engineering Approach to Digital Design" - Prentice Hall of INDIA, 1994.
3. Millman & Halkias, "Integrated Electronics", TMH, 1995.
4. Floyd, "Digital Fundamentals", PHI, 1997.

344. ELECTRICAL ENGINEERING

UNIT-I

D.C.MACHINES:

Construction, principle of operation of D.C.motor and D.C.Generator. Various types of D.C.motors and generators. Performance characteristics of D.C.motors and D.C. generators. Starting and speed control of D.C.motor.

UNIT - II

TRANSFORMERS:

Constructional details and principles of operation of single-phase and three-phase transformers - losses and efficiency. Special types of transformers - Servo stabiliser.

UNIT - III

SYNCHRONOUS MACHINES:

Constructional features - operating principle of 3-phase alternator and synchronous motor. Synchronous motor starting - Hunting, Synchronising and parallel operation.

UNIT - IV

INDUCTION MOTORS:

Constructional features - Operating principle of 3 phase induction motor (squirrel cage and slip ring) - slip torque characteristics - starters - speed control methods.

UNIT - V

SPECIAL MACHINES:

Tachogenerator - A.C. and D.C. Servo motor - Stepper motor - Single-phase induction motors - Linear induction motor - Push button Switches - Contactors - Relays - Sequential Circuit ladder diagram - Selection of motors.

TEXT BOOKS:

1. R.K.RAJPUT, "Electrical Machines - Laxmi Publications, New Delhi -1998.
2. P.C.SEN, "Principles of Electric machines and Power Electronics", JOHN WILEY, Second edition, 1997.

REFERENCE BOOKS:

1. B.L.THERAJA, "Electrical Technology" - Vol.II - S.Chand & company -1997.
2. FOWLER -" Electricity Principles and applications ",TMH,1998.
3. C.R.PAUL, S.A.NASAR and L.E.UNNEWEHR, "Introduction to Electrical Engineering" - McGraw Hill Inc. - 1992.

345. ELECTRIC CIRCUITS

(Computer Aided Teaching through PSPICE Package is recommended)

UNIT 1:

INTRODUCTION

Ohm's and kirchoff's laws - Resistive circuits - Series and parallel reduction - Star and delta transformation - Voltage and current source - source transformation - Introduction to alternating Quantities - Average and RMS values - Analysis of series and parallel and series-parallel RLC circuits - Resonance in series and parallel Electric circuits - Bandwidth and Selectivity of resonance circuits.

UNIT 2:

NETWORK ANALYSIS:

Network graphs - Concept of branch,link,tree,cotree - Incidence matrix - Loop current variables - Loop current equations - Node voltage variables - Node voltage equations - Matrix method of solving dc and ac network - Driving point and transfer impedance/admittance - pole - zero plots and their significance in network funtions - Dual networks.

UNIT 3:

NETWORK THEOREMS:

Superposition theorem - Thevenin's theorem and Nortan's theorem - Maximum power transfer theorem - Reciprocity theorem - Millman's theorem - Substitution theorem - Tellegen's theorem - Statement and application.

UNIT 4:

COUPLED CIRCUITS AND 3 PHASE NETWORKS:

Self Inductance - Mutual Inductance - Co-efficient of coupling - Dot convention - Analysis of coupled circuits - Analysis of single tuned and double tuned coupled circuits involving mutual inductance - Phase sequence - Line and phase quantities - Phasor diagram - Solution of circuits with balanced and unbalanced loads - Power measurement by two wattmeter method.

UNIT 5:

CIRCUIT TRANSIENTS:

Transient response of RL,RC and RLC series and paralled circuits - Solution for step and sinusoidal input using Laplace transform method - Natural frequency, damped frequency, damping factor, logarithmic decrement - response of circuit for non-sinusoidal inputs.

TEXT BOOKS:

1. Joseph. A.Edminister "Electric circuits "Schaum's outline series, McGraw Hill Book Co. - 1987.
2. Sudhakar " Circuits and Networks ",TMH,1998.

REFERENCE BOOKS :

- 1.M.Arumugam and N.Premkumar "Electric Circuit Theory",Khanna Publishers, New Delhi,1991.
- 2.Theodore F.Bogart .Jr "Electric Circuits",2nd Edition - Macmillan/McGraw Hill 1992.
- 3.M.L.Soni, J.C. Gupta and P.V.Gupta "A course in Electrical Circuits and Fields" Dhanpatrai & sons, New Delhi,1981.
- 4.W.H.Hayt and J.E.Kemmerley,"Engineering Circuit Analysis" McGraw Hill, New York, 1962.
- 5.Robert L.Boylestad , "Introductory Circuit Analysis" - 8th edition,Prentice Hall Inc.-1997.
- 6.Richard C.Dorf "Introduction to Electric Circuits"-2nd Edition John Wiley & Sons - 1993.

346. DATA STRUCTURES AND C

UNIT 1:

Primitive data structures - Number system - Integers - Real numbers - character information - logical information - pointer information.

UNIT 2:

Algorithmic notation - statements and control structures - Arithmetic operations and expressions - strings and string operations - Relations and relational operators - Logical operations and expressions.

UNIT 3:

C: Declarations - Fundamental operators - expressions - data input and output control statements.

Storage structure for arrays - structures and array of structures - stacks - Queues - pointers and nonlinear data structures Trees - multilinked structures - pointers and linked allocation linked linear list.

UNIT 4:

C: Declaration of arrays, structures and pointers, Use of arrays, structures and pointers - Formation of linked list and Formation of a linked and addition and deletion on the list - Use of union.

UNIT 5:

File structures: Record organisation - sequential files - External sorting - Indexed sequential files - Direct files - External searching, Reading and writing the files - seek - low label file operations.

TEXT BOOKS:

1. Jean Paul Treamlay, Paul G. Sorenenon, An Introduction to Data Structures and applications, Tata McGraw Hill publishing Company Limited, 1996.
2. Gottfried. B.S. "Programming With C" McGraw Hill, 1986.

REFERENCE BOOKS:

1. Sartaj & Sahani, Data structures, algorithms and applications in C++, McGraw Hill Intel-1, 1998.
2. A.M. Tanenbaum, M. Langsam, M.J. Augesten, Data structure using C and C++, 2nd edition, PHI Pvt Ltd, 1997.
3. Brain W Kernigham & Dennis M. Ritchie, "C programming language, PHI, 1997.

347. ELECTRICAL CIRCUITS AND MACHINES LAB

1. Measurement of active and reactive power and phase-shift in AC circuits.
2. Series and parallel Resonant circuits.
3. Measurement of time constants(RC/RL).
4. Verification of Network Theorems [Superposition, Thevenin, Maximum power transfer]
5. Predetermination of efficiency and regulation of single-phase transformers.
6. Load test on single-phase/three-phase transformers.
7. Load characteristics of DC motors(shunt,series and compound)
8. Load characteristics of DC shunt/compound generators.
9. Load test on alternators.
10. Synchronous motor characteristics.
11. Load test on three-phase induction motors.
12. Load characteristics of a single-phase induction motor.
13. House wiring and earthing.
14. Speed control of DC shunt motor using (a)armature control(b)field control.
15. Swinburne's test.

348. ELECTRONICS LAB I (DEVICES AND DIGITAL)

1. Characteristics of Diodes.(PN junction and Zener Diode)>
2. I/P and O/P characteristics of BJT.
3. Characteristics of FET & UJT.
4. Characteristics Of SCR,TRIAC,DIAC.
5. Characteristics of LDR, Photodiode & Phototransistor.
6. Study of Logic gates.(AND, OR, NOT, NAND, NOR, XOR, EXNOR) Minimisation and realisation of switching functions using NAND, Nor gates.
7. Half adder and Full adder.
8. Code convertors.(BCD to 7 segment, BCD to Excess-3, Gray to binary, Binary to Gray).
9. Multiplexers and Demultiplexers.
- 10 Study of Filp Flops using (a)Universal gates (b) FF ICs.
11. Counters. (MOD-N).
12. Shift Registers.
13. Parity generation and checking.

441. MATHEMATICS IV

UNIT I:

Fourier series: Euler's formula - Dirichlet's conditions Convergence statement only-change of interval odd and even functions.

Half range series-rms value of Parseval's formula-complex form of Fourier series-Harmonic analysis.

UNIT II:

PARTIAL DIFFERENTIAL EQUATIONS;Formation of equations by elimination of arbitrary constants and arbitrary functions-solution of equations-General,particular and complete Integrals-Lagrange's Linear Equation-standard type of first order equations-second order and higher order equations with constant coefficients,homogeneous and nonhomogeneous equations.

UNIT III:

One dimensional wave equation and heat equation:derivation of one dimensional wave equation-Transverse vibration of finite elastic string with fixed ends-boundary and initial value problems-Fourier series solution.Derivation of one dimensional heat equation-steady and unsteady states-boundary and initial value problems-Fourier series solution.

UNIT IV:

Two dimensional heat equation: Two dimensional heat equation-steady state heat flow in two dimensions-Laplace Equations in Cartesian and Polar(annulus including) Fourier series equation.

UNIT V:

FOURIER TRANSFORM: The Infinite Fourier Transform-sine and cosine transforms-properties-Inversion theorem-Finite Fourier Transform-sine and cosine Transforms-Convolution Theorem-Parseval's Identity-Transform of derivatives.

TEXT BOOKS:

- 1.ENGINEERING MATHEMATICS, VOLUME III BY DR. P. KANDASAMY ETAL., S. CHAND AND CO., NEWDELHI, 1996.
- 2.HIGHER ENGINEERING MATHEMATICS BY DR. M.K. VENKATARAMAN,NATIONAL PUBLISHING CO., 1992.

REFERENCE BOOKS:

- 1.ADVANCED ENGINEERING MATHEMATICS , ERWIN KREYZIC, WILEY & CO,1994.
- 2.ADVANCED ENGINEERING MATHEMATICS BY SPEIGEL, SCHAUM'S SERIES,1995.

442.COMPUTER PROGRAMMING

UNIT I:

Abstraction - Abstract data type - Characteristics of OO approach - Characteristics of OO Languages - Objects - Classes - Inheritance - reusability - Creating new data types - Polymorphism and Overloading. Object identification - Different perspective - Object creation attribute identification - Constraint identification - preference identification - Object specification techniques and tools.

UNIT II:

Object oriented design - Object relationship - Communication media - Creating member functions - Virtual and Pure virtual member functions - inline member functions - private and protected member function.

UNIT III:

PROGRAMMING CONCEPTS IN C++

Organisation of a C++ program - Variable types - variable names - Character Variables and strings - escape sequences - Float type variables - use of manipulators - other data types - arithmetic operations. Looping & Branching - Structures & enumerated data types - Functions - objects and Classes.

UNIT IV:

Operator flexibility (overloading)

Overloaded Unary operator - Class member function to return a value - Flexible binary operation - Joining strings - Overloaded relational operator - strings compared using overloaded operators - data conversion - String conversion - Inheritance - Pointers & arrays.

File Handling:

Introduction - String handling - put() and set () functions - Writing & Reading objects of disk file - File handling with Multiple objects - pointers in files - Disk manipulation - Error Situation in File handling - Redirection - Command line arguments.

UNIT V:

An Introduction to JAVA - Comparing JAVA to ANSI C - Comparing JAVA to C++ - The JAVA standard Library - Language features not in C or C++ - Simple programming in JAVA.

TEXT BOOKS:

1. Michael C. Dacorita 1. JAVA for C/C++ Programmers Wiley computer Publishing.
2. Jay ranada, "Mastering in C++", McGraw Hill, 1992.

REFERENCE BOOKS:

1. R. Rajaram, Object Oriented Programming and C++ by - Newage International (P) Ltd., Publishers. 1994.
2. E. Balagurusamy, " Object Oriented Programming ", TMH, 1995.
3. E. Balagurusamy, " Programming with JAVA - a primer " TMH., 1998.

443. MEASUREMENTS AND INSTRUMENTATION

UNIT 1: MEASUREMENTS AND ERRORS

Measurements - significance of measurements - methods of measurement - instruments and measurement systems - classification of instruments - elements of measurement system.

Accuracy and precision - significant figures - types of errors - probability of errors - limiting errors.

UNIT II: BRIDGE MEASUREMENT

Introduction - Wheatstone Bridge - Kelvin Bridge - Guarded Wheatstone Bridge - AC Bridges - Maxwell Bridges - Hay Bridge - Schering Bridge - unbalanced conditions - Wein Bridge - Wagner ground connection.

UNIT III: TRANSDUCERS

Classification of transducers - selecting transducers - strain gauges - displacement transducers - capacitive and inductive transducers - LVDT - oscillation transducer - piezoelectric, potentiometric, velocity transducers - temperature transducers - optical transducers.

UNIT IV: MEASUREMENT OF ELECTRICAL QUANTITIES

DC Voltmeter - DC Ammeter - Ohm meter - Multimeter - AC meters - Electrodynamometer - Watt hour meter - Power factor meter - Instrument transformer - digital voltmeter - component measuring system - Q meter - vector impedance meter - frequency counter.

UNIT V: SIGNAL ANALYSIS AND DISPLAY INSTRUMENTS

Wave analyser - harmonic distortion analyser - spectrum analyser - logic analyser - dual trace oscilloscope - digital storage oscilloscope - XY plotter.

TEXT BOOKS:

1. Albert D. Helfrick, William D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques" - PHI - 1995.
2. Kalsi G.C., "Electronic Instrumentation" - TMH - 1998.

REFERENCE BOOKS:

1. A.K. Sawhney, "A course in Electrical and Electronic Measurement and Instrumentation" - Dhanpat Rai & Sons - 1991.
2. Jones L.D. and Foster Chin. A., "Electronic Instrument and Measurement", John Wiley & Sons, Newyork, 1983.
3. Barney G.C. " Intelligent Instrumentation " - PHI - 1998.
4. A.J. Bouwens, "Digital Instruments" - TMH - 1997.
5. Doeblin, "Measurement systems - Application and Design". 4th edition, Mc Graw Hill., 1970.

444. SOLID STATE CIRCUITS-I

UNIT I

TRANSISTOR BIASING & STABILIZATION:

Transistor as an amplifier. factors affecting the operating point. Q point variation. stabilization. Stability factor .temperature compensation. different methods of transistor biasing. bias compensation .diode, thermistor & sensor compensation. FET & MOSFET Biasing circuits.

UNIT II:

TRANSISTOR AMPLIFIERS:

Load line analysis. classification of amplifiers. analysis of amplifiers CE, CB, CC, CS, CD, & CG Circuits using small signal analysis. multistage transistor amplifiers. RC coupled amplifiers. hybrid equivalent circuits of transistor. low frequency response of transistor amplifiers. FET amplifiers at low & high frequencies.

UNIT III: DIRECT COUPLED AMPLIFIERS:

Difference amplifiers. CMRR. Transfer characteristics. Difference amplifiers with constant current source. difference amplifiers using FET's. analysis of cascode amplifier.

UNIT IV : FEEDBACK AMPLIFIERS:

General theory of feedback. advantages of negative feedback. analysis of BJT feedback amplifiers. analysis of different types of negative feedback in transistor circuits. Darlington conversion. Biasing Darlington amplifier. frequency response & stability.

UNIT V

POWER SUPPLIES:

Half wave, full wave & bridge rectifiers. analysis of above circuits using shunt, capacitor filter & PI filters. Voltage regulation. shunt & series type regulators using BJT, switched mode power supplies.

TEXT BOOKS:

1. Millman, J & Halkias, C "Electronic devices and circuits", Tata Mc Graw Hill, 1995.

REFERENCE BOOKS:

1. Bell A.D. "Electronic devices and circuits", Prentice hall of India, 1998-3rd edition.
2. Mottershead, A "Electronic devices and circuits" Prentice hall of India., 1994.
3. Mithal G.K. "Electronic devices and circuits", Khanna Publishers, 1997.
4. Salivahanan & Others, " Electron Devices & Circuits, TMH, 1998.

445. ELECTROMAGNETICS AND WAVEGUIDES

UNIT 1:

VECTOR ANALYSIS:

Vector field. Co-ordinate systems - definition. Rectangular, cylindrical and spherical Co-ordinate systems, Elementary length, elementary area and elementary volume.

ELECTROSTATICS:

The experimental law of Coulomb. Electric field Intensity. Calculation of field due to the following charge distributions: a) Point charge. b) infinite line charge along the gauss's law. calculation of field using gauss 's law for symmetrical charge distribution. definition of potential. the potential of a charge point. conservative property. potential gradient. Poission's and Laplace equations. Solution of Laplace's equation (one dimensional problems). Current and current density. Continuity of current. Point form of Ohm's law.

UNIT-II

THE STEADY MAGNETIC FIELD:

Biot-Savart's law. Ampere's circuital law. Curl. Stoke's theorem. Magnetic field and magnetic flux density. Calculation of magnetic to a) an infinitely long straight filament carrying current b) finite length current element c) current loop d) infinitely long solenoid e) toroid and f) co-axial cable

UNIT III

TIME VARYING FIELDS & MAXWELLS EQUATIONS:

Faradays law, displacement current. Generalisation of ampere circuital law. Maxwells equations in point form. Maxwells equation in integral form. Derivation of wave equations. Wave equation for a conducting medium.

UNIT IV

UNIFORM PLANE WAVES , REFLECTION AND REFRACTION:

Uniform plane wave propagation. Wave propagation in good dielectrics. Wave propagation in good conductors. Reflection by perfect conductor. Normal incidence and oblique incidence. Reflection by a perfect dielectric-normal incidence and oblique incidence. Surface impedance. Poyntings theorem. Instantaneous , average and complex poynting vector.

UNIT V

GUIDED WAVES AND WAVEGUIDES:

Waves between parallel planes transverse electric waves. Transverse magnetic waves. TEM waves. Attenuation in parallel plane guides. Rectangular guides. TM and TE modes in rectangular guides. Circular guides. TM and TE modes in circular guides. Attenuation. Factor of wave guides.

TEXT BOOKS:

1. WILLIAM H. HAYT, "ENGINEERING ELECTROMAGNETICS" McGRAW HILL, 4th EDITION-1987.
2. JORDAN E.C. & K.G. BALMAIN.: "ELECTROMAGNETIC WAVES AND RADIATING SYSTEMS" PHI, 2nd EDITION 1994.

REFERENCE BOOKS:

1. PLONSEY, R & R.E. COLLIN: "PRINCIPLES AND APPLICATIONS OF ELECTRO MAGNETIC FIELDS" , McGRAW HILL. 1987.
2. RAMOS. J.R. WHINNERY & T.VAN DUZER: "FIELDS AND WAVES IN COMMUNICATION ELECTRONICS" JOHN WILEY, 1994, Third edition.
3. N.N. RAO, "ELEMENTS OF ENGINEERING ELECTRO MAGNETICS", PHI 1998
4. JOSEPH A EDMINISTER, "THEORY AND PROBLEMS OF ELECTROMAGNETICS"

446. NETWORKS AND TRANSMISSION LINES

UNIT 1:

NETWORKS :

Classification of Networks - Electrical characteristics, symmetrical and asymmetrical Networks - Iterative impedances - Image and iterative Transfer constants - Insertion loss - Characteristics of Passive four terminal networks - (T, pie, lattice, bridged T, twin-T and matching networks).

UNIT 2:

NETWORK ANALYSIS AND SYNTHESIS :

Network parameters (Z, Y, H AND ABCD) - Conversion of parameters - Zeros and poles - Synthesis of lossless Single port two element network (Cauer and Foster types only)

UNIT 3:

FILTERS :

Characteristic impedance and propagation constant of pure reactive networks - transmission and attenuation bands - Constant k, m derived and composite filters - design procedures.

UNIT 4:

TRANSMISSION LINES :

Fundamental quantities - Primary constants - Transmission line equations - infinite line - Surge impedance - Propagation, Attenuation and phase constants - Wave length, Velocity of propagation and Group velocity computation of primary and secondary constants - Line with any termination - Reflection Coefficient - Standing waves - SWR.

UNIT 5:

LOW FREQUENCY AND RADIO FREQUENCY TRANSMISSION LINES : Characteristics - distortion - distortionless transmission - loading practice Radio frequency transmission lines: Characteristics - Standing waves - Input impedance of open and short circuited lines - SWR - Input Impedance of lossless line - Skin Effect- Smith chart and its applications.

TEXT BOOKS:

1. Ryder J.D. "Network lines and Fields" - Prentice Hall of India, 2nd Edition - 1995.
2. F.F.Kuo, " Networks Analysis and Synthesis ", Wiley Eastern Ltd., second edition, 1986.
3. Sudhakar, " Circuits and Networks", TMH, 1998.

REFERENCE BOOKS:

1. Umesh Sinha "Network analysis and synthesis" sathya Prakashan Publishers - 1985.
2. Umesh Sinha "Transmission lines and Networks" Sathya Prakashan Publishers - 1985.
3. Van Valkenburg " Introduction to modern network Synthesis" Wiley Eastern Publications, 1986.

447 - COMPUTER LAB

1. Program to sum the following series:
Sum = $1 - x^2/2! + x^4/4! + \dots$
 2. Program to arrange a list of numbers in ascending / descending order.
 3. Program to search a number in a list using binary search.
 4. Program to convert decimal no. into a binary no. and vice-versa
 5. Program to find a string whether polyndrome or not.
 6. Program to reverse a string.
 7. Program to manipulate matrices.
- Programs using class mechanisms:
8. Program to simulate the functions of a simple calculator.
 9. Program to manipulate strings without using any predefined string functions.
 10. Program to process students mark-sheet.
 11. Program to prepare pay-bill for an organisation.
 12. Program for election processing.
 13. Program for electric bill calculation.
 14. Develop a web-page for your institution using JAVA.
 15. Develop a web-page that links files like voice, movie and text.

448. ELECTRONICS LAB II

1. Study of half-wave and full-wave rectifiers with and without filters.
2. Voltage Regulators. (Zener Diode, Transistor - Series and Shunt type)
3. Design and testing of BJT amplifiers. (RC Coupled).
4. Design and testing of FET amplifiers.
5. Design and Testing of Feedback amplifiers. (Voltage and Current, Series and Shunt type).
6. Design & testing of Constant-K filters.
7. Design & testing of m-derived filters.
8. Emitter Follower.
9. Difference Amplifier.

541. VECTOR SPACE AND PROBABILITY THEORY

UNIT-I

VECTOR SPACE THEORY: Axioms of vector space - Concept of linear independence, basis and dimension - Examples - Norm and inner product - Inner product spaces - Hilbert spaces - Examples.

UNIT-II

ORTHOGONALISATION, SIGNALS AND SYSTEMS : Orthogonal expansion - Schwartz inequality - Parseval's relations - Choice of basis function - Gram-Schmidt procedure.

Classification of signals and systems (elementary level) - Wavelet transform : Definition and properties, time frequency Resolution of wavelet transform, orthonormal wavelet.

UNIT-III

PROBABILITY THEORY : Axioms of probability - Probability space - Joint and conditional probability - Independent events. Random variable - Densities and distributions with example - Joint distributions and densities - Conditional probability distribution and density - Independent events.

UNIT-IV

RANDOM PROCESS : Functions of random variables - Statistical averages - characteristic functions - Random process : Definition, basic concept and examples. Stationary and ergodicity - Second order processes - Covariance functions.

UNIT-V

GAUSSIAN PROCESS AND NOISE : Transmission of random process through a linear filter - Power spectral density, Gaussian process - Noise.

TEXT BOOKS:

1. PEEBLES, PAYTON Z. Jr. "Probability, Random variable and Random signal principles", McGraw HILL, 1993 (3/e).
2. PAPOULIS, ATHANASIOS, "Probability, Random variables and stochastic process". 3/e. McGRAW HILL, 1994.
3. HOFFMANN KENNETH & KUNZE, RAY, "Linear Algebra". 2/e, PHI, 1994.

REFERENCE BOOKS:

1. SIMON HAYKINS, "Communication systems" (3/e), JOHN WILEY & SONS. 1994.
2. NOBLE, BEN AND DANIEL, JAMES W. "Applied Linear Algebra", 3/e. PHI, 1998..
3. MORTENSEN, RICHARD E. "Random Signals and systems", John wiley & sons. (1/e), 1987.
4. GABEL, ROBERT A. & ROBERT, RICHARD A, "Signals and linear systems" 3/e. John wiley & sons, 1987..

542. ANALOG MODULATION AND SYSTEMS.

UNIT I: SIGNAL ANALYSIS:

Fourier series representation of periodic functions-complex spectrum-fourier Transform of aperiodic wave form-properties of Fourier transform-Energy density function-Autocorrelation function- Properties of autocorrelation-spectral density-relation between spectral density & auto correlation function .

UNIT II : NOISE:

Introduction-atmospheric noise-thermal noise-noise in resistor networks and complex impedance-available power- noise in two port networks-noise figure calculations for two port networks-cascaded networks-noise temperature-shot noise-noise in diode, triodes and other tubes-measurement of noise figure-noise in junction transistors.

UNIT III: AMPLITUDE MODULATION

Need for modulation, amplitude modulation: frequency spectrum of AM wave-power and current relations- modulation index-generation of AM wave-gradual non-linear modulator-piecewise linear modulator-DSBSC-ring modulator-product modulator-SSB - generation of SSB - vestigial sideband transmission. Demodulators: diode detectors - synchronous detection-detection of DSBFC,DSBSC,SSB and VSB signals.

UNIT IV: ANGLE MODULATION

Basic definition of frequency and phase modulation-spectra of narrowband and wideband FM signals with single tone modulation. Multitone FM signals and the circuits used(direct and indirect method). Pre-emphasis-FM receivers: slope detection-balanced slope detectors-phase discriminators-ratio detectors-amplitude limiting-zero crossing detectors-PLL method.

UNIT V: NOISE IN AM AND FM SYSTEMS AND MULTIPLEXING:

SSB-SC - calculation of signal power-calculation of noise power-output signal to noise ratio.DSBSC-calculation of signal power-noise power-signal to noise ratio-double sideband with carrier. Output signal to noise ratio-figure of merit: frequency modulation-calculation of output signal and noise powers-signal to noise ratio-deemphasis-SNR improvement using preemphasis-comparison of AM and FM.

Frequency translation and frequency division multiplexing, quadrature multiplexing.

TEXT BOOKS:

1. SIMON HAYKINS: COMMUNICATION SYSTEMS.JOHN WILEY & SONS 1994
2. HERBERT,TAUB,DONALD I.SCHLLING:PRINCIPLES OF COMMUNICATION SYSTEMS. McGraw Hill 1994.
3. KENNEDY: ELECTRONIC COMMUNICATION SYSTEMS.McGraw Hill 1995.

REFERENCE BOOKS:

1. RODDY AND COOLEN: ELECTRONIC COMMUNICATION.PHI 1995.
2. K.SAM SHANMUGAM: DIGITAL AND ANALOG COMMUNICATION SYSTEMS.JOHN WILEY & SONS 1980.
3. JACK.A. SMITH, MODERN COMMUNICATION CIRCUITS, TMH, 1998.

543. SOLID-STATE CIRCUITS II

UNIT I: OSCILLATORS:

Classification of oscillators-condition for oscillation-Analysis & Design of various types of Oscillators using BJT & FET-Frequency stability.

UNIT II: MULTIVIBRATORS

Classification - Analysis and Design of Astable, monostable and bistable multivibrators - Blocking oscillators - Current and voltage Sweep generators.

UNIT III: BAND-PASS AND WIDE-BAND AMPLIFIERS:

Single-tuned amplifiers-Impedance matching to improve gain-Double-tuned amplifiers-Synchronously-tuned amplifiers and stagger-tuned amplifiers-Cascode amplifiers-Video amplifiers-Peaking circuits.

UNIT IV: LARGE SIGNAL AMPLIFIERS

Class A CE Amplifiers - Power Calculations - Class A Push pull amplifier - Class B and Class AB push pull amplifiers - Efficiency calculations - transformerless Class B push pull amplifier - Amplifier using complementary symmetry - Class C Amplifier - Class D - Class S amplifiers.

UNIT V: POWER ELECTRONIC CIRCUITS

Phase control - Full wave power control circuit using SCR - Half controlled bridge circuits - UJT phase control circuit - phase control using Triac - Single phase bridge inverter - Chopper circuits.

TEXT BOOKS:

1. MILLMAN & GRABEL "Microelectronics", McGraw Hill International Edition - 1987.
2. Schilling and Belove, "Electronic Circuits", McGraw HILL, 1989.

REFERENCE BOOKS:

1. THEODORE F. BOGART "Electronic devices & Circuits " Prentice Hall Inc. - 1997.
2. WILLIAM D. STANLEY "Electronic devices, circuits and applications " Prentice Hall Inc - 1989.
3. MARK N. HORENSTEIN "Microelectronic circuits and devices" - Prentice Hall of India - 2nd Edition - 1996.
4. MILLMAN AND TAUB "Pulse and digital switching waveforms",- McGrawHill.
5. MALVINO "Electronic principles"-TMH - 1998.
6. Salivahanan & Others, " Electron Devices and Circuits", TMH, 1998.

544. LINEAR INTEGRATED CIRCUITS AND APPLICATIONS.

UNIT I

Op-amp characteristics and applications: characteristics of ideal op-amp. Pin configuration of 741 opamp. Bias, offsets and drift, bandwidth and slew rate. Frequency compensation. Applications: inverting and non-inverting amplifiers, inverting and non inverting summers, difference amplifier, differentiator and integrator. Log and antilog amplifiers. Multiplier and divider, analog computers.

UNIT II

Comparators and signal generators: comparators, regenerative comparators, input-output characteristics, astable multivibrator, Monostable multivibrator, Triangular wave-generators, RC-phaseshift oscillator, Wein's bridge oscillator.

UNIT III

VOLTAGE REGULATORS:

Series opamp regulator. Ic voltage regulator, 723 general purpose regulator, Switching Regulators.

UNIT IV

ACTIVE FILTERS ,TIMERS AND MULTIPLIERS:

Low pass, High pass, Band pass and Band Reject filters, Butterworth, Chebychev filters, first and second order filters-switched capacitor filters. 555 Timer functional diagram, monostable and astable operation. multiplier - applications.

UNIT V:

PLL, ADC AND DAC:

PLL-basic block diagram and operation, capture range and lock range simple applications of PLL, AM detection, FM detection and FSK demodulation. Weighted resistor DAC, R-2R and inverted R-2R DAC, monolithic DAC. Flash ADC, counter type ADC, successive approximation ADC, dual slope ADC, conversion times of typical ADC.

TEXT BOOKS:

1. D.ROY CHOUDHURY & SHAIL JAIN- "LINEAR INTEGRATED CIRCUITS".

REFERENCE BOOKS:

1. Gayakwad.A.R., " Op-amps & Linear ICs" - PHI , 1993
2. Coughlin.Frand.Driscoll.F.F., " Operational Amplifiers & Linear ICs " - PHI, 1997.
3. Millman & Halkias., "Integrated Electronics" - McGraw Hill, 1991.
4. Franco, " Design with operational amplifier and analog _ integrated circuits", TMH 1998.

545. ANTENNAS AND WAVE PROPAGATION

UNIT 1: RADIATION:

Retarded potentials-Radiation from an alternating element-Monopoles and Dipoles-Halfwave dipole-Antenna terminology-isotropic radiators-radiation pattern -radiation intensity - directive gain -power gain - antenna efficiency - effective area -effective length and aperture -Reciprocity theorem-radiation resistance -self and mutual impedance of antennas -antenna beam width.

UNIT 2: ANTENNA ARRAYS AND SPECIAL ANTENNAS:

Two element array-Linear array -broad - side array,end - fire array-multiplication of patterns - Binomial array - stacked arrays - Folded dipole - Yagi-Uda antenna - corner reflector - horn antenna-Helical antenna - qualitative treatment of slot antenna - discone antenna - log periodic antenna -parabolic reflector -Cassegrain feed - cheese feed - lens antennas - feed for lens antennas.

UNIT 3 : LF,MF AND HF ANTENNAS:

VLF and LF transmitting antennas - effects of ground on antenna performance -grounded antennas- effects of antenna height - physical height and effective height of antenna - Beverage antenna - medium frequency antennas- tower radiator - high frequency antennas -half wave dipole - dipole antennas - long wire antennas - V and inverted V antennas - rhombic antenna - rhombic arrays - travelling wave antennas - radio direction finding -loop antennas - Adcock direction finders - Bellini Tosi Type.

UNIT 4 : PROPAGATION :

Factors involved in the propagation of radio waves -the ground wave - Reflection of radio waves by the surface of the earth - Space wave propagation - Considerations in space wave propagation - Atmospheric effects in space wave propagation -ionosphere and its effects on radio waves - mechanism of ionospheric propagation - Refraction and reflection of sky waves by the ionosphere - ray paths - Skip distance - maximum usable frequency - Vertical and oblique incidence - fading of signals - selective fading -diversity of reception.

UNIT 5 : MEASUREMENTS:

Antenna measurements : Input impedance - bridge method - SWR method - radiation pattern measurement - beam width measurement - gain measurement - measurement of radiation resistance - radiation efficiency measurement - measurement of effective aperture - polarisation measurement, ionospheric measurements.

TEXT BOOKS:

1. Edward C. Jordan ., "Elecromagnetic waves and radiating systems ", PRENTICE HALL.1995.
2. John D.Ryder., "Antennas", TMH, 1998.

REFERENCE BOOKS :

1. Prasad.K.D., "Antennas and wave Propagation ",Sathya Prakashan.1996.
2. Terman F.E ., " Electronic and radio engineering",McGraw Hill 1955.
3. Terman F.E and J.M.Pettit., " Electronic Measurements", McGraw Hill,1984.
4. Kraus, " Antennas", TMH,1998.
5. Balanis, "Antenna Theory", John Wiley,1995.

546. CONTROL SYSTEMS.

UNIT I:INTRODUCTION

Open loop and closed loop systems - Translational and Rotational mechanical systems and analogous electrical systems -Basic components of Control systems - Potentiometer - Synchronos - Tachogenerator - A.C and D.C Servo motor.Mathematical representation, Block diagram, signal flow graph and Transfer function of electrical systems.

UNIT II:

Time response - step response of first order and second order systems - time domain Specifications - Type and order of a system - steady state error - Static error and generalized error coefficients - frequency response - frequency domain specifications - Estimation of the specifications for a second order system.

UNIT III:

Stability - Characteristic equation - location of roots in splane for stability - Routh Hurwitz criterion - Root Locus - Nichol's chart.

UNIT IV:

Bode plot - Nyquist stability criterion - Applications of Bode plots and Nyquist stability criterion for the design of amplifiers.

UNIT V:

P,PI and PID Controllers - Fuzzy Control -Introduction to fuzzy logic and application of fuzzy logic to Control systems - temperature controller.

TEXT BOOKS:

1. M.GOPAL "Control System - Principles & Design", TMH, 1997.
2. OGATA.K : "Modern control systems Engineering", PHI,1997.

REFERENCE BOOKS:

1. NAGRATH & GOPAL : "Control System Engineering",II Edition,Wiley & Sons.1982.
2. BENJAMIN .C.Kuo : "Automatic Control Systems" 'III Edition,PHI.1987.

547. INTEGRATED CIRCUITS LABORATORY

- 1.Measurement of Op-amp Parameters. (Gain, Input offset Voltage, Input offset current, Bias Current, CMRR, Output Voltage, Slew rate)
- 2.Determination Of Frequency response of Op-Amp.
- 3.Operational Amplifier applications I (Inverter, Non-inverter, summer, Buffer, Subtractor, Integrator, Differentiator)
- 4.operational Amplifier applications II (Logarithmic amplifier, Antilog Amplifier, Precision Rectifier)
- 5.Instrumentation Amplifier.
- 6.Open Loop operation of Op-amp -Comparators - Zero crossing detectors - Schmitt Trigger.
- 7.Astable Mutivibrator using op-amp - Square, Triangular & rectangular Wave Generators.
- 8.Sinusoidal Oscillators - RC Phase shift and Wien Bridge.
- 9.Active Filters - I & II order
- 10.Astable & Monostable Multi vibrators using 555 IC Timer.
- 11.IC Voltage Regulator.

548.ELECTRONICS AND COMMUNICATION LAB.

1. Design and testing of power amplifiers(Class A,B,AB,C,complementary-symmetry push-pull amplifiers.)
2. Design and testing of single-tuned amplifiers.
3. Cascode/wide-band amplifiers.
4. Clipping and clamping circuits.
5. Astable,monostable,bistable multivibrators.(Transistor version).
6. Voltage and current sweep generators.
7. Amplitude modulation and detection.
8. Frequency modulation and detection.
9. Pre-emphasis,De-emphasis circuits.
10. IF amplifier/mixer circuits.
13. Radio receiver measurements.
14. Attenuators and equalisers.

641. COMPUTER SYSTEM ARCHITECTURE

UNIT I: BASIC COMPUTER ARCHITECTURE

Instruction codes: Stored program organisation-Indirect address.
Computer Registers: Common bus system. Computer instructions:
Instruction set completeness. Timing and Control-Instruction Cycle:
Fetch and Decode-Determine the Type of Instruction-Register-Reference
Instructions: Memory-Reference Instructions-Input and Output Interrupt-Design
of Basic Computer Design of Accumulator logic: Control of AC register-Adder
and Logic circuit.

UNIT II: MICROPROGRAMMED CONTROL:

Control Memory-Address Sequencing: Conditional Branching-
Mapping of Instruction-Subroutines. Microprogram Example:Computer
Configuration-Microinstruction Format-Symbolic Microinstructions-The Fetch
Routine-Symbolic Microprogram-Binary Microprogram.Design of Control Unit:
Microprogram Sequencer.

UNIT III: CENTRAL PROCESSING UNIT:

General Register Organisation: Control word.Stack organisation.Instruction
Formats-Addressing Modes-Data transfer and Manipulation:Data Transfer
Instructions-Data ManipulationInstructions-Arithmetic Instructions-Logical and
Bit Manipulation Instructions-Shift Instructions. Program control: Status
bit conditions-Conditional Branch Instructions-Subroutine Call and Return-
Program Interrupt-Types of Interrupts. Reduced Instruction set
Computer (RISC):CISCCharacteristics-RISC Characteristics-Overlapped Register
Windows-Berkeley RISC I.

UNIT IV: COMPUTER ARITHMETIC AND MEMORY ORGANIZATION

Addition and Subtraction:Hardware Implementation-Hardware Algorithm-
addition and Subtraction with Signed-2's Complement Data.Multiplication
Algorithms:Booth Multiplication Algorithm-Array Multiplier.
Division Algorithms: Divide overflow-Hardware Algorithm.Floating
Point Arithmetic Operations:Basic considerations-Register Configuration-
Addition and Subtraction-Multiplication-Division.

Main Memory-Auxiliary Memory-Associative Memory:Hardware Organisation-
Match Logic-Read operation-Write operation.Cache memory-Associative
Mapping-Direct Mapping-Set-Associative Mapping-Writing into Cache-
Cache Initialization.Virtual Memory-Address space and Memory space-
Address mapping Using Pages-Associative Memory page table-Page
Replacement-Memory Management Hardware:Segmented-Page Mapping-
Numerical Example-Memory protection.

UNIT V: PIPELINE,VECTOR PROCESSING AND MULTIPROCESSORS:

Parallel Processing-Pipelining-Arithmetic Pipeline-Instruction
Pipeline:Example:Four_Segment Instruction Pipeline-Data Dependency-Handling
of Branch Instructions.RISC Pipeline:Example: Three Segment Instruction
pipeline-Delayed load-Delayed branch.Vector Processing:Vector operations-
Matrix Multiplication-MemoryInterleaving-Supercomputers.array processors:
Attached Array Processor-SIMD Array processor.

TEXT BOOKS:

1. Morris Mano.M., Computer System architecture,PHI,1993.

REFERENCE BOOKS:

1. Hamacher.V.C.,Vranesic.Z.G and Zaky.S.G.,Computer Organisation,
McGraw Hill, New York,III Edition,1990.
2. Hayes," Computer System Architecture",Mc Graw Hill,1998.

642. INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH.

UNIT-I

INTRODUCTION : Evolution of industrial engineering, Fields and functions of industrial engineering. Methods engineering : Process charts, motion study, work sampling and work measurement.

PLANT DESIGN : Phases of plant design, plant location and building, factors influencing plant location, factory building and its considerations, plant layout, types of layout, material handling principles, equipments and selection.

UNIT-II

PRODUCTION PLANNING AND CONTROL : Introduction , objectives, components of PPC, manufacturing systems, Forecasting, Product planning, Loading and scheduling, dispatching, production control, Case studies.

HUMAN ENGINEERING : Ergonomics, design of controls and displays, heating, ventilation, glare, air flow, influence of factory environment on productivity, industrial safety.

UNIT-III

LINEAR PROGRAMMING TECHNIQUES : Operations research and decision making, types of mathematical models and constructing the model, role of computers in operations research, formulation of linear programming problem, applications and limitations, simplex method (analytical and graphical).

UNIT-IV

TRANSPORTATION PROBLEMS: Vogel's approximation method, modified distribution method, optimisation models, unbalance and degeneracy in transportation model.

ASSIGNMENT MODELS : Hungarian algorithm, travelling salesman problem, NETWORK ANALYSIS : PERT and CPM, total slack, probability of achieving completion date, cost analysis, updating, resource smoothing- role of computers in network analysis.

UNIT V

INDUSTRIAL MANAGEMENT: Nature of management and its process - contribution of Taylor and Fayol to management - functions and Principles of management - Types of organisations - Organisation charts and manuals - Industrial ownership - types, formation. Merits and Demerits - management by objective - Management by exception and management information system.

TEXT BOOKS:

1. Elwood, S. Buffa, "Modern Production/Operations Management", Wiley Eastern, 1991.
2. Kanthi Swarup et.al. "Operations Research", Sultan Chand & Sons, New Delhi, 1996.

REFERENCE BOOKS:

1. Mayal, W.H. "Industrial Design for Engineers", ILIFFE Books Ltd. London, 1967.
2. Dharani Venkatakrishnan, S. "Operations Research", Keerthi Publication House, Coimbatore, 1991.
3. Srinath, L.S. "Network analysis", East-West Press, New Delhi, 1982.
4. Gupta and Hira, "Problems in operations Research", S. Chand & Co., 1991.

643. DIGITAL COMMUNICATION

UNIT I: PULSE MODULATION SYSTEMS

Sampling theorem-low pass signals-band pass signals-pulse amplitude modulation-channel bandwidth for PAM-natural sampling-flat top sampling-signal recovery through holding PPM, PWM-generation and detection.

UNIT II: PULSE CODE MODULATION & DELTA MODULATION

Quantization of signals-quantization error-pulse code modulation-electrical representation of binary digits - PCM system-companding-multiplexing PCM signals - differential PCM - Delta modulation-adaptive delta modulation-voice coders - channel vocoder-linear predictive coder-synchronization.

UNIT III: DIGITAL MODULATION AND DATA TRANSMISSION

Binary phase shift keying-differential phase shift keying-differentially encoded PSK-quadrature phase shift keying-baseband signal receiver-probability of error-the optimum filter-white noise-the matched filter-coherent reception correlation-phase shift keying-frequency shift keying-non coherent detection of FSK-differential PSK-four phase PSK.

UNIT IV: NOISE IN DIGITAL SYSTEM AND SPREAD SPECTRUM

PCM transmission-calculation of quantisation noise-the output signal power-the effect of thermal noise-the output signal to noise ratio in PCM-delta modulation-quantization noise in delta modulation-output signal power-effect of thermal noise-signal to noise ratio-delta pulse code modulation-comparison of PCM and DM. Spread spectrum transmission-receiving-tracking-spread spectrum communication.

UNIT V: INFORMATION THEORY AND CODING

Discrete messages-amount of information-average information-entropy-information rate-Shannon's theorem-capacity of gaussian channel-bandwidth-S/N trade off-coding-parity check bit coding-block codes coding and decoding-probability of error with coding-algebraic codes-burst error correction - convolution codes-comparison of coded and uncoded systems.

TEXT BOOKS:

1) TAUB AND SCHLLING-PRINCIPLES OF COMMUNICATION SYSTEMS, Mc GRAW HILL, 1986.

REFERENCE BOOKS:

- 1) SAM SHANMUGAM.K. "DIGITAL AND ANALOG COMMUNICATION SYSTEMS"-JOHN WILEY & SONS, 1979.
- 2) LATHI.B.P. "MORDERN DIGITAL AND ANALOG COMMUNICATION SYSTEMS" Holt & Reinhart publishers 1995.
- 3) PROAKIS, "DIGITAL COMMUNICATION ", TMH 1998.
- 4) Simon etal, " Digital Communication Techniques", PHI, 1998.

644.Microprocessors and Micro Controllers

UNIT I:

Organization of 8085 microprocessor-Instruction set-Addressing modes-Assembly language programming-machine cycles-Read,Write-Interrupt acknowledge-Bus cycles-states-Wait state-HALT and HOLD state-State transition sequence of 8085.

UNIT II:

Organisation of 8086 microprocessor-memory segmentation-Addressing bytes and words-Address formation-Addressing modes in 8086-Assembly language programming-minimum mode and maximum mode-Bus arbitration in minimum mode and maximum mode -multiprocessing.

UNIT III:

Organisation of 8051 microcontroller-I/Oports-External memory-Counter and Timers-Serial data input and output-Interrupts -Instruction set-Addressing modes-Assembly language programming.

UNIT IV:

Interfacing memory and I/O devices with 8-85 and 8086 microprocessors-main memory system design-types of main memory-Address decoding techniques-Partial block-PROM,PCA and PAL decoders-Design eamples-Wait state generator-Interfacing dynamic RAM -Parallel I/O-Designing a parallel input and output port-Application for the device select pulse-memory mapped I/O-Serial I/O-standard protocols.

UNIT V:

Data transfer schemes-Programmed data transfer-Synchronous transfer-Asynchronous transfer-Interrupt driven I/O-types of interrupts:8085 and 8086-direct memory access data transfer-DMA transfer in a 8085 based system - DMA protocols in 8086 in minimum and maximum mode-types of DMA.

TEXT BOOKS:

- 1.Ramesh.S.Gaonkar "Microprocessor architecture,programming & applications with 8085/8080A" -Penram International - 1997.
- 2.Yu.Cheng Liu & Glenn A Gibson, "Microcomputer system, 8086/8088 family"-2nd Edition - PHI-1986.
- 3.Kenneth J.Ayala "The 8051 Microcontroller Architecture, Programming & Applications"-Penram International publishing-1996.

REFERENCE BOOKS:

- 1.D.V.Hall "Microprocessor and Digital system"-McGraw Hill Publishing Company-1990.
- 2.Ajit Pal "Microprocessor Principles and Applications"-Tata McGraw Hill-1990.
- 3.Kenneth L Short"Microprocessor and programmed logic" PHI,1987.
- 4.Avatar singh and Walter A.Tribel "16 bit microprocessor, Architecture, software and interface techniques",PHI 1985.

645. DIGITAL SIGNAL PROCESSING

UNIT -I:

Theory of continuous time signals and discrete time signals (unit step and impulse functions) -Transformation of independent variables in signals-Complex analytic signals.

Linear Time Invariant Systems(both discrete &continuous):Linearity -Time invariant - Causality - BIBO stability - Response of continuous time LTI system using convolution integral-Response of discrete time LTI system using convolution sum-Finding impulse response of LTI system(continuous time) using Laplace Transform - Z Transform & its properties - Finding impulse response of discrete time LTI system using Z Transform.

UNIT-II:

Frequency response or transform function of an LTI system(first and second order)-Realisation structures:Direct forms-I & II.Circular and sectioned convolutions-Introduction to radix-2.Fast Fourier transform (FFT)- Decimation-in-frequency radix-2 FFT-Computation of Inverse FFT through FFT.Programs for FFT using MATLAB.

UNIT- III:

Filter Design:Magnitude and phase response of digital filters-Linear phase response-(Types of windows-Design of FIR filter using rectangular and Hamming windows.Frequency sampling- IIR digital filter design from continuous time filters using bilinear transformation.Programs for design of filters(FIR &IIR) using MATLAB.

UNIT-IV:

Quantization of fixed point numbers and floating point numbers-Analysis of coefficient quantization effects in FIR filters - Need for scaling - Limit Cycle oscillations - Analysis of product round off error - Round off with calculation using MATLAB.

UNIT V :

Applications of DSP : Musical Sound Processing - Digital FM stereo generation - voice privacy system - Transmultiplexers.

Introduction to programmable DSP:Instruction set of TMS 320C50 - simple programs.

TEXT BOOKS:

1. Sanjit K Mitra, Digital Signal Processing - A computer based approach - Tata McGraw Hill 1998.
2. Allan V.Oppenheim & Donald W.Schafer, Digital Signal Processing- Prentice Hall of India 1989.

REFERENCE BOOKS:

1. Ludeman "Fundamentals of Digital signal processing" Harper and Row Publications 1986.
2. Andreas Antoniou,Digital Filter Analysis & Design, TMH,1996.
3. Texas Instruments,'Users Guide TMS 320C50.
4. Defatta D.J., Lucas and Hodgkiss "Digital Signal Processing" John Wiley and Sons 1995.

646. COMMUNICATION ENGINEERING

UNIT 1: AM & FM TRANSMITTERS:

Allocation of frequency for various services- AM transmitters- block schematic- high level and low level transmitters- class C- R.F tuned amplifiers- frequency multiplier- SSB transmitters- ISB transmitters- FM transmitters- telegraph transmitters- telephone transmitters- privacy equipments.

UNIT 2: AM AND FM RECEIVERS

Receivers characteristics- TRF receiver- super heterodyne receiver- choice of IF and oscillator frequencies- image rejection- tracking- AGC, delayed AGC- AFC- FM receivers- HF communication receivers- SSB receivers- FM stereo broadcast principles.

UNIT 3: COMMUNICATION OVER POWER LINES:

Need for methods of power system communications - mode of coupling to power lines - power line carrier frequency - frequency assignment - modulation methods - system description.

UNIT 4: SATELLITE COMMUNICATION

Satellite orbits- station keeping systems- satellite altitude- transmission path- path loss- noise considerations- the satellite systems- saturation flux density- effective isotropic radiated power- multiple access methods- TDMA- Indian domestic satellite system- INSAT network- spacecraft- antenna subsystems.

UNIT 5: CELLULAR COMMUNICATION

Introduction to cellular mobile systems- a basic cellular system- performance criteria- operation of cellular systems- planning a cellular system- maximum number of calls per cell- maximum number of frequency channels- concept of frequency reverse channels- cell splitting- permanent splitting- real time splitting- frequency management channel assignment.

TEXT BOOKS:

1. Roody & Coolen, Electronic Communication Phi 1995.
2. William C.Y. Lee, Mobile Cellular Telecommunications Mc Graw Hill International Edition 1998.

Reference Books:

1. Kennedy, Electronic Communication Systems Tmh 1996.
2. Anokh Singh, Principles Of Communication Engineering S.Chand Co.

647. COMMUNICATION LAB

1. Programs using MATLAB :
 - a) to test the linearity, causality and stability of a LTI system.
 - b) To find FFT of the given sequence using DIT and DIF FFT algorithms
 - c) To find IFFT of the given sequence using DIT and DIF IFFT algorithms.
 - d) Programs to design IIR filter using Bilinear transformation impulse invariant method.
 - e). Programs to design FIR linear phase filters using window techniques. (any two types).
 - f) Programs to design FIR FILTERS using frequency sampling techniques.
 - g). Programs to realise the following digital filters.
 - a. Direct form I and II.
 - b. Cascade and Parallel form.
- 2) RF Tuned Amplifier
3. Video Amplifier with shunt & series peaking circuits.
4. DSP Experiments Based on TMS 320C50. implementation of
 - a). LPF.
 - b). FFT.
 - c). Convolution .
5. FM modulation using XR 2206 & Demodulation using NE565.

648. MICROPROCESSOR LAB-I

(Write programs using assemblers for 8085, 8086 and 8051)

List of Experiments:

8085 Assembly Language program

1. Multibyte Addition and Subtraction
Multibyte decimal addition and subtraction.
2. Multiplication and division - repetitive addition and use of a register shifting operation - Signed and unsigned numbers.
3. Code conversion - BCD to Binary, Binary to BCD, Binary to Gray, Gray to Binary, Binary to Excess 3 code, BCD to seven segment code.
4. Searching, Sorting and data transfer.
5. Square root of a number, Sum of first N-natural Numbers, Average, LCM and BCD, Factorial and delay loops.
6. 8086 Assembly Language Program : Search and Sort, Programs involving string instructions.
7. Simple program using 8051 Assembly Language.
8. Study of programmable I/O ports of 8051 microcontroller.
9. Study of interrupt structure of 8085, 8086 and 8051.

741.MICROPROCESSOR INTERFACING TECHNIQUES

UNIT I:

Micro Computer Communication techniques and Interfacing - Methods of parallel data transfer - Programmable parallel ports - 8255 PPI - Serial Communication - Asynchronous - Synchronous - 8251A Programmable communication interface - DMA - 8237 - Programmable DMA Controller.

UNIT II:

Support Peripherals: 8259A Programmable interrupt controller - 8279 programmable Keyboard/display interface - 8353 programmable interval Timer - 8295 printer controller chip - 8275 - CRT Controller.

UNIT III:

Co-processors - 8087 NDP - Data types - Processor architecture - Instruction set - 8089 -I/O processor - IOP architecture - Communication between CPU and IOP - IOP instruction set - 8288 - Bus Controller - 8289 Bus arbiter.

UNIT IV:

Interface standards - S-100 Bus - IEEE - 488 interface bus - IBM PC Bus - Serial interface - RS 232, RS 422 and RS 423 serial interface - Current Loop.

UNIT V:

Input/Output Interface - Printer interface using 8295 - CRT interface - Keyboard/Display interfacing - A/D and D/A interface - Data acquisition systems - Interfacing high power devices - Microprocessor development system - applications - Temperature controller - Stepper motor controller.

TEXT BOOKS:

1. HALL D.V. "Microprocessor and Interfacing - Programming and Hardware" Tata McGraw Hill - 1991.
2. LIU.Y. and GIBSON "Microcomputer System, the 8086/8088 family architecture, Programming and Design"-PHI - 1986.
3. JOHN UFFENBECK "The 8086/8088 family, Design, Programming and interfacing" - PHI -1994.

REFERENCE BOOKS:

1. M.RAFIQUZZAMAN "Microprocessor theory and applications-Intel and Motorola" PHI - 1992.
2. M.RAFIQUZZAMAN "Microprocessors and Microcomputer based system design" CRC Press - Inc.Boca Ratan, Florida,1990.
3. Peripheral Components - Intel 1992.
4. A.P.MATHUR "Introduction to Microprocessors" - TMH - 1995.

742.TELEVISION ENGINEERING

UNIT I

Television picture and TV Standards :

Geometric form and aspect ratio of the picture - Scanning - Interlaced Scanning - Number of scanned lines - Vertical & Horizontal resolution - Picture brightness - Transfer characteristics - Negative transmission - Vestigial Sideband transmission - Complete Channel bandwidth - Reception of Vestigial side band signals - Allocation of frequency bands of TV signals - CCIRB and FCC standards.

Camera Tubes : Camera tube requirements - Iconoscope - Image orthicon - Vidicon - Plumbicon - Silicon diode array - Solid state Image scanners - Gamma correction.

UNIT II

Television Transmitters :

Requirement of TV broadcast transmission - TV transmitters - Visual exciter - Aural exciter - Diplexers - Transmitting Antennas - Microwave TV relay systems - Television via satellite- CCTV - Cable television - TV receiver as a data communication terminal - Teleconference.

UNIT III

Television Receiver :

Receiver Block diagrams - Receiving antennas - Balun and IF filters - RF tuners - VHF tuners - IF stage - IF response - Wave traps - Video detector - Video amplifier - DC restoration - Sync separator - Vertical and Horizontal deflection system - Vertical output stage - EHT generation - Picture tube - Beam, deflection - Centering and focussing - Geometric Distortion in raster - Sound section.

UNIT IV

Colour Television :

Nature of colour - Chromacity diagram - Compatability with monochrome and Vice Versa - Colour TV - Transmission and reception - Video tape recording - VCR / VCPs - Video disks - Tele text and video text systems - Video games.

UNIT V

Advances in TV Technology :

Projection Television - Stereo sound in TV - 3D TV picture - Digital TV - High definition TV (HDTV) - Flat panel display - TV via satellite.

TEXT BOOKS:

1.Gulati.R.R., "Monochrome and Colour Television" - Wiley Eastern Ltd, 1994.

REFERENCE BOOKS :

1.Grob.B ., "Basic Television Principles and Servicing " - McGraw Hill, Kogakusha, Ltd. 1992.

2.Gulati.R.R., "Modern TV Practice" - Wiley Eastern Ltd., 1992.

3. A.M.Dhake, "Television Engineering" Tata McGraw Hill, 1998.

743.OPTICAL COMMUNICATION

UNIT-I

BASIC SYSTEM CONCEPTS : Review of Electrical Communication systems - Need for optical Communication.Electrical Vs Optical communication - Advantages and Applications - EM spectrum - System model description - Selection of system components - Choice of operating wave length - System performance - Future trends.

UNIT-II

OPTICAL SOURCES & RECEIVERS : Characteristics and requirements - Spontaneous and stimulated emission- Source classifications: Ruby, He-Ne LASER,Homo and Hetero structures,LASER Diodes and LEDs chacteristics,Comparison and applications.

OPTICAL RECEIVERS : Requirements - Methods of detection process - Comparison .Basic principles of photodetection - Photo diode - PIN diode - Avalanche photo multiplier - Comparison - S/N consideration - Receiver configurations - Pre amplifier for detectors.

UNIT-III

MODULATION TECHNIQUES : Classifications,Direct/Internal modulation: Analog and digital modulation formats - External modulators:Electro-optic and Acousto-optic modulators - comparison - System configuration.

UNIT-IV

TRANSMISSION MEDIA : Fiber-Optics Vs Coaxial cables - Optical fiber modes and configurations - Light propagation - Fiber transmission properties,Attenuation and pulse dispersion,Choice of wave length for fiber_optic transmission -Cable configurations - Splicers,connectors and couplers.

UNIT-V

SYSTEM CONFIGURATIONS : LASER radar system - Fiber optic digital trunking systems - Fiber optic link for computers - Multichannel audio/video communication systems - Repeater/Regenerator for fiber-optic systems - System design : Power budget and Rise-time Budget - Introduction to I/O devices.

TEXT BOOKS:

1. Keiser.G."Optical Fiber Communications",McGRAW Hill,2nd ed.,1991

REFERENCE BOOKS :

1. Gower.J."Optical Communication Systems",Prentice Hall 2nd ed,5th Reprint,1995.
2. CSELT,"Optical Fiber Communication",McGRAW Hill,1981.
3. Yarvi.A."Quantum Electronics",John Wiley,4th Ed,1991.
4. Max-Ming-Kang Liu, "Principles and applications of optical communications",TMH,1996.

744.COMMUNICATION SWITCHING SYSTEMS

UNIT-I

Telegraph codes,Teleprinter,Telex,Fascimile system,Principle and operation - Manual telephone system - Automatic system - switching Principle & subscriber apparatus - signalling currents - Trunking diagram.

UNIT-II

Cross bar switching - Electronic switching - Time division switching - space division switching - Time Multiplexing-Space & Time switching - combination switching - Multichannel carrier telephone systems - coaxial telephone systems - overseas communication through marine cables.

UNIT-III

Network traffic load & Parameters - Grade of Service and Blocking Probability - Modelling Switching systems - Incoming traffic and service time characterisation - Blocking models & Loss estimates.

UNIT-IV

Principle of STD - Stored program control - Centralised SPC - Distributed SPC - Enhanced services - Fiber optic communication - Telecommunication applications.

UNIT-V

Subscriber loop system - Switching Hierarchy and Routing - Tx plan & systems - Inchannel and common channel signalling - Basics of cellular mobile telephones - LANs - MANs - WANs - Internetworking - ISDN,ISDN services,Broadband ISDN,Voice data integration.

TEXT BOOKS:

1. Viswanathan.T,"Telecommunication switching systems and Networks",Prentice Hall of India Ltd.,1994.

REFERENCE BOOKS:

1. N.N.Biswas,"Principles of Telegraphy",Asia Publishing House,1975.
2. N.N.Biswas,"Principles of Telephony",Asia Publishing House,1985.
3. N.N.Biswas,"Principles of carrier communication",Asia Publishing House,1975.
4. P.N.Dass,"Introduction to Automatic Telephony",Modern Agency Pvt Ltd,Calcutta,1966.
5. P.N.Dass,"Carrier current Engineering",Modern Book agency,Calcutta,1964.

747.MICROPROCESSOR LAB II

List of Experiments:

1. Study of 8255 PPI Square wave generation using mode 0 - Parallel data transfer between two microprocessor kits using mode 1 and mode2.
2. Study of 8253 Timer - Six modes of operation - Measurement of unknown frequency of a square wave - Programmable square wave generation.
3. Study of 8259 programmable interrupt controller - Development of interrupt service routine.
- 4.8279 Keyboard/display controller - Keyboard scan - blinking and rolling display.
5. Study of 8251 programmable communication interface - Study of RS 232-C serial bus standard - serial communication between two microprocessor kits using RS 232-C interface.
6. Unencoded keyboard interface and multiplexed seven segment display.
7. D/A converter and waveform generation.
8. A/D converter interface - data acquisition - unipolar and bipolar signals - Sample and Hold - Instrumentation amplifier.
9. Stepper motor controller interface.
10. DC motor speed controller interface.
11. Temperature monitoring and control.
12. Study of IBM PC bus - IBM PC compatible cards (I/O card, D/A & A/D card, Timer card)
13. EPROM Programmer.
14. Interfacing High power devices to microcomputer port lines LED, relays, Solenoids, Solid state relays and LCD display.
15. Study of Microcomputer development system.

841. COMPUTER COMMUNICATION

UNIT 1: INTRODUCTION :

Computer Networks - A Perspective - Goals -Applications-Switching techniques- Circuit switching - Message switching - Packet switching - Network components existing network - ARPANET - Concepts of network protocol -OSI reference model - Basics of Queuing theory - Queuing models - Poisson statistics - M/M/1 Queues - Little's formula - Applicatios to M/M/1 queue.

UNIT 2: LOCAL AREA NETWORKS :

Topologies - Star - Ring ,Bus -Ethernet - Transmission media - LAN Access Techniques - Polling -contention -ALOHA - CSMA -CSMA/CD -Token Bus and Token Ring protocols -Delay throughput characteristics - Token Ring and CSMA/CD Bus -Performance comparisions.

UNIT 3: DATA COMMUNICATION TECHNIQUES:

Asynchronous and Synchronous communication - BISYNC ,SDLC,HDLC - X 2.5 procedures- Error control coding.

UNIT 4: INTER-NETWORKING:

Principles - Bridges - Routing with Bridges - Routers - TCP/IP -Protocol structure - Internet protocol - Transmission control protocol - Applications.

UNIT 5: BROADBAND NETWORKS:

ISDN -User Access- Transmission structure - ISDN Protocol Limitations - B-ISDN -ATM concepts and principles - Introduction to VSAT networks.

TEXT BOOKS:

1. Tannenbaum., " Computer Networks",Prentice Hall India,1989.
2. Forouzan, "Introduction to Data Communication and Networking", TMH, 1998.

REFERENCE BOOKS:

1. William , Stallings., "Data and Computer Communication", Prentice Hall India,1994.
2. Keiser,G.E., "Local Area Networks",McGraw Hill,1989.
3. Basandra ,S.K., " Local Area Networks ", Galgotia Publications,1993.
4. Vijay,Ahuja., "Design and Analysis of Computer Communication Networks", McGraw Hill,1985.
5. Uyles,Black., " Computer Networks,Protocols,Standards and Interfaces",Prentice Hall International Edition,1987.

842.VLSI DESIGN

UNIT I

INTRODUCTION TO MOS TECHNOLOGY:

MOS Technology & VLSI -Basic MOS transistor -depletion & enhancement type -NMOS & CMOS Transistors fabrications -electrical properties of MOS circuits - characteristics -threshold voltage - transconductance - pass transistors - NMOS Inverter -pull-up pull-down ratio for NMOS Inverter driven by NMOS Inverter & through one or more pass transistors - CMOS Inverter - latch-up-sheet-resistance & capacitance calculation - delay calculation - super buffer - HMOS & native transistors.

UNIT II

LAYOUT DESIGN:

MOS & CMOS Layers - stick diagram - design rules & layout - subsystems design: switch logic - gate logic - other forms logic - combinational logic design example: passing generator - bus arbitration logic multiplexers - gray to binary code converter - sequential circuit example: two phase clocking - dynamic register element - dynamic shift register - precharged bus concept - scaling circuits.

UNIT III

DESIGN OF SYSTEM:

PLA - Finite state machine - PLA based finite state machine design - design of 4-bit shifter - design of ALU subsystem:adders - multiplexers - memory: dynamic shift register - dynamic RAM cells - one transistor dynamic memory cell - 4*4 bit register array - RAM array.

UNIT IV

TOOLS FOR DESIGN:

Grounds rules for successful design - design styles & philosophy - CAD tools for design & simulation: textual entry layout language - graphical entry layout - design verification - design rule checkers - simulators - tests & testability.

UNIT V

CMOS DESIGN PROJECTS & FAST VLSI CIRCUITS;

Incremental/decremental - left/right - serial/parallel shift register - comparator - GaAs device - layout design for GaAs devices.

TEXT BOOKS:

1. D.A.Pucknell & K.Eshraghian ., BASIC VLSI DESIGN, PHI, 1993.

REFERENCE BOOKS:

1. R.L.Geiger & P.H.Allen & N.R.Starder., VLSI DESIGN TECHNIQUES FOR ANALOG & DIGITAL CIRCUITS , McGRAWHILL INTERNATIONAL EDITION ,1990

843.MICROWAVE ELECTRONICS AND RADAR ENGINEERING

UNIT I:

Passive microwave devices: Terminations, attenuators, phase changers, directional couplers and hybrid junctions. Microwave propagation in ferrites, Faraday rotation. Ferrite devices- isolators, gyrators and circulators.

UNIT II:

Matrix description of microwave circuits: scattering matrix formulation - symmetry of scattering matrix, scattering matrix for a loss less junction and two-port junction. Basic microwave measurements: frequency, wavelength, attenuation, power, impedance, VSWR and dielectric constant.

UNIT III:

Microwave tubes: High frequency effects in conventional tubes, Klystrons: velocity modulation, bunching, output power and efficiency for two cavity klystrons, multi-cavity klystrons, reflex klystrons - velocity modulation, power output and efficiency, helix TWT - operation principle, magnetrons - types, principles of operation, hull cut-off condition, pushing and pulling.

UNIT IV:

Microwave solid-state devices: Microwave transistors - JFET, MESFET, MOSFET: physical structures, principles of operation and characteristics. Transferred electron devices (TED's): GUNN effect - GUNN diode, gunn diode as oscillator and amplifier. Avalanche transit-time devices. LASER and MASER.

UNIT V:

RADAR SYSTEMS:

RADAR equations - Monostatic & bistatic RADAR - CW RADAR - FM RADAR altimeters - MTI & Pulse Doppler RADAR - tracking RADARs - Conical scan, sequential loping monopulse. Line type and Hard tube modulation - Duplexers and displays - RADAR antennas.

TEXT BOOKS:

1. S.Y. LIAO: "MICROWAVE DEVICES AND CIRCUITS", PHI, 1992.
2. M.L. SISODIA AND G.S.RAGHUVANSHI: "MICROWAVE CIRCUITS AND PASSIVE DEVICES" NEW AGE INTERNATIONAL, WILEY EASTERN LTD., 1991
3. SKOLNIK.M.I., "INTRODUCTION TO RADAR SYSTEMS", MCGRAW HILL KOGAKUSHA LTD., 2nd EDITION, 1992.

REFERENCE BOOKS:

1. GEORGE KENNEDY "ELECTRONIC COMMUNICATION SYSTEMS", MCGRAW HILL , 1995.
2. K.C.GUPTA "MICROWAVES", WILEY EASTERN LTD., 1983.
3. HUND "MICROWAVE COMMUNICATION", TMH, 1989.
4. COLLINS, " MICROWAVE ELECTRONICS", MCGRAW HILL, 1990.

846.MICROWAVE AND COMMUNICATION LAB.

1. Study of sampling theorem.
2. PCM Encoder and Decoder.
3. Delta modulation encoder and decoder.
4. Study of ASK, FSK, PSK.
5. Study of PAM, PDM, PPM.
6. Experiments using microwave Bench:
 - a) Frequency, Wavelength and attenuation measurements.
 - b) VSWR measurements (low and high).
 - c) Impedance measurements.
 - d) Antenna measurements-directivity and gain.
 - e) Directional coupler-directivity and coupling coefficient.
 - f) Isolator and circulator -characteristics.
 - g) Reflex klystron-mode characteristics.
 - h) Gunn diode characteristics.
 - i) E-plane, H-plane and magic -T.
7. Study of transmission and reception through optical link.
8. Characteristics of optical source and detector.

A3.DIGITAL IMAGE PROCESSING

UNIT I

DIGITAL IMAGE FUNDAMENTALS : Elements of a Digital Image Processing system - Structure of the Human eye - Image formation and contrast sensitivity - Sampling and Quantization - Neighbours of a pixel -Distance measures - Photographic film structure and exposure - Film characteristics - Linear scanner - Video camera - Image processing applications .

Image transforms : Introduction to Fourier transform - DFT - Properties of two dimensional FT - Separability, Translation - Periodicity , Rotation , Average value - FFT algorithm - Walsh transform - Hadamard transform - Discrete Cosine transform.

UNIT II

IMAGE ENHANCEMENT : Definition - Spatial domain methods - Frequency domain methods - Histogram modification technique - Neighbourhood averaging - Media filtering - Lowpass filtering - Averaging of multiple images - Image sharpening by differentiation and high pass filtering.

UNIT III

IMAGE RESTORATION : Definition - Degradation model - Discrete formulation - Circulant matrices - Block circulant matrices - Effect of diagonalization of circulant and block matrices - Unconstrained and constrained restorations - Inverse filtering - Wiener filter - Restoration in spatial domain .

UNIT IV

IMAGE ENCODING: Objective and subjective fidelity criteria - Basic encoding process - The mapping - The quantizer - The coder differential encoding - Contour encoding - Run length encoding - Image encoding relative to fidelity criterion - Differential pulse code modulation.

UNIT V

IMAGE ANALYSIS AND COMPUTER VISION : Typical computer vision system - Image analysis techniques - Spatial feature extraction - Amplitude and Histogram features - Transform features - Edge detection - Gradient operators - Boundary extraction - Edge linking - Boundary representation - Boundary matching - Shape representation.

TEXT BOOKS:

1. Rafael, C. Gonzalez., and Paul, Wintz. "Digital Image Processing ", Addison - Wesley Publishing Company, 1987
2. William, K.Pratt., "Digital Image Processing "John Wiley and Sons , 1978.

REFERENCE BOOKS:

1. Rosenfeld, and Kak , A.C., " Digital Image Processing " Academic press , 1979.
2. Anil.K.Jain., "Fundamentals of Digital Image Processing".PHI, 1995

A8.NEURAL NETWORKS

UNIT -I

Fundamentals of Artificial neural networks - biological prototype -Artificial neuron -Activation functions single layer Artificial neuron networks-Multilayer artificial networks- Nonlinear activation function - Recurrent networks - Training of artificial neural networks- Training algorithms .Perceptrons-Perceptron representation- Exclusive or problem -Linear separability -Limitation and overcoming the Linear separability - Storage Efficiency perceptron learning - Perceptron training algorithm -Delta rule - Problems with training algorithm.

UNIT - II

Backpropagation -Training algorithm-Advanced algorithms-Applications Practical difficulties-counter propagation networks-Network structure, Normal operation -Training the Kohonen layer and Grossberg layer - Full counter propagation network application.

UNIT - III

Statistical methods - Training applications - Boltzmann training -Cauchy training - Artificial specific heat method - Applications to general nonlinear optimization problems - Back propagation and cauchy training - Combined back propagation cauchy training.
Hopfield nets - Recurrent network configurations -Binary systems-Stability associative memory - continuous systems - Hopfield net and the Boltzmann machine - Thermodynamic systems - Statistical Hopfield networks generalized networks -Applications- A/D converter - Travelling salesman problem - Local minima - speed energy function - Network capacity.

UNIT - IV

Bidirectional Associative memories - BAM structure - Retrieving a stored association - Encoding the associations memory capacity - continuous BAM - Adaptive BAM-Competitive BAM.Adaptive Resonance Theory - ART architecture ART classification operation-ART Implementation ART Training example - Characteristics of ART theorems of ART.

UNIT - V

Optical Neural Networks- Vector matrix multipliers, Electro-optical multipliers - Hopfield net using electro-optical matrix multipliers - Holographic correlators volume holograms - optical hopfield net using volume holograms. Cognitron structure - Generalization - Calculation - Training - Neocognitron structure - Generalization - Calculation - Training .

TEXT BOOKS:

1. P.D.WASSERMAN : Neural Computing theory and practice, Van Nostrand Reinhld, New York,1989.
2. Patterson, " Artificial Neural Networks", PHI,1994.

REFERENCE BOOKS :

1. JOHN HERTZ, ANDERS KROGH,RICHARD P. PALMER: Introduction to the theory of Neural Computation , Lecture notes vol.I. Addison - Wesley Publishing Company 1991.
2. JAMES A.FREEMAN, DAVID M.SKAPURA: Neural Networks , Algorithms applications and Programming Techniques , Addison - Wesley Publishing Company , 1991.
3. ROBERT HOCT - NIELEN : Neurocomputing ,Addision - Wesley Publishing Company ,1991,Fn,neural.
4. IGOR ALEKSANDER AND NELEN MORTON : " An Introduction to Neural Computing ", chapman and Hall,1990.
5. N.K.Bose,P.Liang, " Neural Network Fundamentals ", T.M.H., 1996.
6. Zurada "Introduction to Neural Networks", Jaico publications,1994.

B2. PERSONAL COMPUTER SYSTEMS

UNIT I:

Microprocessor in PC: Intel 8088 - Internal Organisation - Bus cycle - 8088 operation - I/O Addressing - Interrupt handling - 8088 Instructions - Co-processor support chips in the mother board - Clock generator - 8284 bus controller - Interrupt controller 8259 - programmable Timer 8253 - 8255 PPI - 8237 DMA controller.

UNIT II:

Mother board circuits - Mother board functions - CPU Nucleus logic - DMA logic - Wait state logic - BUS arbitration logic - ROM logic - RAM logic - NMI Logic - I/O ports decode logic - Dynamic memory refresh logic - Speaker logic - Mode switch input logic - Key board interface -Co-processor unit - control, Address and data bus logic - I/O slot signals -SMPS.

UNIT III:

Controller and Adapters: Printer controller - Floppy controller - Hard disk controller sub system - Display Adapter - Serial port in PC - Real time Clock.

UNIT IV:

Structure MS - DOS - ROM - BIOS services - the fundamentals of DOS - the DOS functions of INT 21H - Disks and files under DOS - Memory allocation - Program loading and execution - Interrupt handling through DOS - Filters for DOS.

Windows OS: Windows 95 - Device drivers for windows - system architecture - Virtual machine - Window based applications.

UNIT V:

Over view of Advance PCs - PC - advanced technology - AT versions by IBM AT/386, AT/486 pentium features - Small computer system interface (SCSI) - PC bus interfacing - Typical Add-on card structure.

TEXT BOOKS:

1. PC/TX technical reference manual.
2. Charles A. Halt "Microcomputer organisation - hardware and software", Mcmillian Publishing Co., Newyork, 1985.

REFERENCE BOOKS:

1. Peter Norton and John Goodman "Peter Norton's Inside the PC" - 7th Edition - Tech media - 1998.
2. Peripheral components - Intel - 1992.
3. Walter Grey "System Programming for Windows 95", Microsoft press, 1996.
4. B.Govindarajalu " IBM PC and Hardware, Trouble Shooting and Maintenance", TMH , 1992.
5. S.K. Bose "Hardware and software of personal computers",Wiley Eastern Limited, 1991.

B8.DATA COMMUNICATION AND ISDN

UNIT I

Data communication techniques: Introduction, switching-Data communication networks ,Asynchronous and synchronous transmission-error control techniques, Linear block codes, cyclic codes-Forward error detection-Automatic repeat request-Acknowledgement mechanisms-Numbering methods

UNIT II

INTERFACING:

Baseband interface standards RS 232C, RS422,RS423, RS449 interface- IEEE 488 communication interface-Data transmission using analog carriers-MODEMS employing FSK,PSK, QPSK,QAM and MSK-message transfer by acoustical coupler-message transfer by hardware attachment.

UNIT III

DATA COMMUNICATION SOFTWARE:

Systems approach,system network architecture (SNA),Communication software examples-Software design and testing protocols.OSI model,TCP/IP.

UNIT IV

DATA COMMUNICATION CONTROL:

Protocols-Link oriented protocols Asynchronous protocols data link control-Binary synchronous communication SDLC HDLC.

UNIT V

ISDN:

Overview of ISDN-ISDN Channels-User access ISDN protocols-Introduction to Broadband ISDN(B-ISDN).

TEXT BOOKS:

1. William Stallings, "Data and computer communications" PHI,International Edition, V edition,1997.

REFERENCE BOOKS :

- 1.Jerry Fitzgerald, Tom.s. Eason,"Fundamentals of Data communication"John Wiley and Sons,1978
- 2.Vincent .F.Alisouskas,Wayne Tomasi,"Digital and data communications"Prentice Hall of India.,New Jersey,1985
- 3.Driscoll .F. "Data communications"PHI, International Edition,1992.
- 4.Forouzan," Introduction to data Communication and Networking", TMH, 1998.