

ELECTRONICS AND COMMUNICATION ENGINEERING

SECONDD YEAR

201 MATHEMATICS III

FIRST TERM:

- 1. Ordinary Differential Equations and some Special Function:** Series solutions ordinary differential equations, Legendre and Bessel function and their properties.
8 Lectures
- 2. Partial Differential Equations:** Second order linear and quasi-linear partial differential equations, elliptic, parabolic and hyperbolic types, boundary and initial conditions solutions of Dirichlet and Neumann problems for Laplace equation and of heat conduction problems by Fourier method, D'Alembert solution of 1-D wave equation and solution of Cauchy problem.
8 Lectures
- 3. Functions of a Complex Variable:** Review of complex numbers, formulae of Euler and De Moivre, analytic functions, Cauchy Riemann conditions elementary complex functions and analytic function in terms of a power series, Laurent series, residue theorem, contour integration.
8 Lectures

SECOND TERM:

Probability and Statistics: Axiomatic definition of probability, laws of probabilities classical occupancy problem with illustrations, conditional, probability

multiplication law, independence of events, Bayes rule, discrete and continuous random variables-cumulative distribution functions, probability mass function, probability density function, mathematical expectation, mean, variance, moment generating function and characteristic function, standard probability models-binomial, Poisson, exponential, Weibull, normal and log normal, sampling and sampling distribution z , t , Chi-square and F , estimation of parameters, use of t , Chi-square and F in test significance. 24 Lectures

BOOKS RECOMMENDED:

TEXT BOOKS:

1. Advance Engineering Mathematics by E. Kreyszig, Wiley eastern Pvt. Ltd. (India)

REFERENCE BOOKS:

1. Advance Engineering Mathematics by C.R. Wysle
2. Mathematics of Physics and Modern Engineering by Sckolonikoff & Redhelfer
3. Advance Mathematics for Engineers and Physicists by L.A. Pipes

202 COMPUTATIONAL TECHNIQUES

FIRST TERM:

1. **Types of Computer:** Digital, analog and hybrid, organization of a digital computer system-CPU memory, I/O devices, representation of numbers-integer and floating point arithmetic, round off errors and their propagation.
2. **Introduction to computer languages:** Assembly language, higher languages compilers, problem solving using computers algorithm, flow chart, examples, FORTRAN programming, constant and variables, arithmetic expression I/O statements, specification statement, control statements, subscribed variables, logical expression, function and subroutines, examples of programming should include numerical as well as non-numeric matrix operations, searching, sorting etc.
3. **Iterative Techniques for solution of equation:** Simple iteration scheme, Newton-Raphson method, secant method, their rates of convergence, order of errors, etc. roots of polynomial equation, Gaussian elimination, Gauss-Siedel iteration, matrix inversion by Gaussian method, computation of determinant, polynomial approximation.

SECOND TERM:

Lagrangian interpolation of polynomial, Aitkin's methods, method, Newton's forward difference formula, curve fitting (least square), Trapezoidal method,

Simpson's Rule, order of errors in integrations, solutions of initial value problems, Euler's methods, and 4th order Runge Kutta (algorithm only).

COMPUTATIONAL LABORATORY

FIRST TERM:

Familiarization with PC and DOS, preparing ASC II files using editors/word processors, system utilities, compiling and running, programme development in FORTRAN, number theoretic problems, series summation, matrix and vector operation, non-numeric data processing, searching and sorting.

SECOND TERM:

Numerical techniques finding roots of a function, quadrature, integration and solution of differential equations, interpolation and curve fitting solution of linear simultaneous equations and matrix inversions

TEXT BOOKS:

1. Computer Programming & Numerical Methods (For Engineers) by Swami Saran, P.K. Swami and K.K. Singh, Sarita Publishers, Meerut
2. Computer Oriented Numerical Methods by V. Rajaram, Prentice Hall of India

REFERENCE BOOKS:

1. Elementary Numerical Analysis by S.D. Conte
2. Introductory Methods of Numerical Analysis by S.S. Shastri
3. Numerical Methods in Engineering by M.G. Salve
4. Computing for Engineering by R. T. Fennes

203 BASIC ELECTRONICS

FIRST TERM:

P-n junction, Depletion layer, Barrier potential, forward and reverse bias, breakdown voltage, piv Characteristics of p-n junction diode knee voltage, load line and opt ideal p-n junction diode, junction capacitance, zener diode

Rectifiers and fitters-half wave, centre tap full wave and bridge rectifier, percentage of regulation, piv, ripple factor, C, RC, LC and PI filter, voltage double, clipping and clamping ckt voltage regulation

BJT- Introduction, basic theory of operation of PNP and NPN transistor, V-I characteristics, CB, CE and CC configuration, junction FET-introduction, theory of operation, JEFT parameters JEFT-amplifiers

MOSFET- Introduction, theory of operation MOSFET parameters application. Graphical analysis of BJT and FET circuits, linear models of BJT and PET Pulse and large signal models of BJT and FET

SECOND TERM:

Basic BJT and FET Amplifiers

Introductory idea of multistage and feedback amplifiers

Biasing, base bias, emitter feedback bias, collector feedback bias, voltage divider bias, load line and operating point

Integrated ckt-ideal op-amp, analysis of principle of integration simple op-amp, ckt intro to digital integrated circuits light source –LED.

Photo detectors- Photo diode and photo transistors, thyristors-introduction to thyristors family, SCR characteristics and ratings

TRIAC- Theory of operation, characteristics and rating voltage control By SCR and TRIAC

UJT- Introduction, basic theory of operation, characteristics and structure, complementary and programmable UJT relaxation oscillator.

204 NETWORK THEORY

FIRST TERM:

1. Linear time invariant first order circuits
2. Linear time invariant second order circuits
3. Response to an arbitrary input
4. Coupling elements and coupled circuits
5. Network graphs, Tellegen's theorem, loop and cutset analysis

SECOND TERM:

1. State equations
2. Natural frequencies
3. Network functions
4. Two-port networks

5. Definition of positive real function, testing of driving point function
6. Synthesis of one port L-C, R-C and R-L network
7. Two port synthesis and filter design

TEXT BOOKS:

1. Basic circuit theory by Deoser and Kuh, Mc Graw Hill
2. Network theory and filter design by Aatre, Wiley Eastern
3. Network Analysis by Van Valkenburg

REFERENCE BOOKS:

1. Electrical Network Theory by Balbanian and Bickert, John Wiley and Sons
2. Modern Network Synthesis by Van Valkenburg, Wiley Eastern
3. Circuit Theory by TSKV Iyer, Tata Mc Graw

205 ELECTRICAL MACHINE – I

FIRST TERM:

Single phase Transformer: Construction and principle, e.m.f, equation, Phasor diagram, equivalent circuit, testing of transformer, regulation and efficiency, parallel operation. Auto Transformer, reactance calculation and mechanical stress per unit system

Three Phase Transformer: Transformer connections and vector groups, harmonics, parallel operation, phase conversions and testing of 3-phase transformer, cooling of transformer

D.C. Machine: Constructional features and types of D.C. Machines, windings, basic principle, e.m.f. f., torque and speed equations, Commutation and armature reaction.

SECOND TERM:

D.C. Motor characteristic, starting and speed control, testing and efficiency

Induction Machine: Basic theory and construction, windings Phasor diagram and equivalent circuit. Torque speed characteristics, Effect of Rotor resistance. Testing and circle diagram. Deep bar and double cage motor, starting and speed control. 3 phase A.C. Accumulator motor, (Schrage motor), Induction generator

TEXT BOOKS:

1. Electric Machines— By Fitzgerald and Kingsley (Mc Graw Hill)
2. Electric Machines - By Nagarath and Kothari (Tara Mc. Graw Hill)
3. Alternating current Machine - By M.G. Say

206 MECHANICS OF SOLIDS-I

FIRST TERM:

1. **Introduction and fundamental concepts:** Introduction-purpose and scope of the subject, generalized procedure, basic assumption, types of forces (External and Internal forces), method of sections, constitutive laws, Elastic material, Principle of Super position, St. Venant's Principle Tensile test, generalized Hook's law for isotropic and linear elastic material.

5 Lectures

2. **Simple stress and stain:** Uniaxial tension or compression of a bar (prismatic and non-prismatic), cases of simple shear, shear strain components in terms of shear stress, Bi-axial and tri-axial

tension or compression, Thermal stress and strain, statically determinate system of bars in tension (or compression), thin walled pressure vessels, cylindrical and spherical shells.

8 Lectures

- 3. Shearing Force and Bending Moment:** Use of singularity functions in drawing B.M.D and S.F.D. 6 Lectures
- 4. Stress due to bending:** Pure bending of beams, normal stress and shear stress distribution in a beam subjected to both B.M.D. and S.F.D. 6 Lectures

SECOND TERM:

- 1. Deflection due to bending:** Double integration method, moment area method. 4 Lectures
- 2. Torsion:** Torsion of solid and hollow circular shaft, Torsion of a hollow thin walled shaft, closed coiled helical spring Flanged couple. 5 Lectures
- 3. Two-dimensional stress analysis:** Plane stress components on a general plane at a point, Mohr's circle of stress. 6 Lectures
- 4. Cases of combined loading:** Bending with tension (or compression) Eccentrically loaded member, core of section, torsion and shear, torsion and bending cases of transmission shafts subjected to bending tension or axial thrust. 6 Lectures
- 5. Elastic strain energy and its application:** Elastic strain energy of a rod under various kinds of loading-Elastic strain, energy for various states of stress, simple applications, Castiglians Theorem. 4 Lectures

LABORATORY WORK:

Minimum eight experiments bases on the theory covered under the subject.

BOOK RECOMMENDED:

1. Mechanics of Solids – Kazmi
2. Mechanics of Solids – Singh and Jha
3. Mechanics of Solids – Ryder

REFERENCES:

1. Mechanics of Solids – Timoshenko and Gere
2. Introduction to Mechanics of Solids – Grandall and Dahl
3. Mechanics of Solids – Popov

214 THERMODYNAMICS I

FIRST TERM:

- 1. Sources of Energy:** Solar, fossil, nuclear, geothermal, wind, tidal and bio-mass energy, basic principles of energy conversion, direct and indirect energy conversion methods. 4 Lectures
- 2. Basic Concepts:** Dimensions and units, thermodynamic systems and their properties, Zeroth law and temperature equilibrium concept. 3 Lectures

3. **First Law of Thermodynamics:** Concept of work and heat, first law applied to open and closed systems, internal energy and enthalpy- flow work examples, gases vapours, Laws of perfect gas, specific heat at constant pressure and constant volume, PVT relations.
4. **PVT Surface for Steam:** Properties of steam, use of steam tables, simple thermodynamic process involving gases and vapours. 7 Lectures
5. **Helhotz and Gibb's functions, Maxwell's relations** 3 Lectures
6. **Second Law of Thermodynamics:** Introduction, Kelvin-plank and classisus statements and their equivalence, reversible cycle-Carnot cycle, Corollaries of second law, classisus inequality entropy as a property, principle of increase of entropy, entropy, and calculation of entropy change in ideal gas processes. 7 Lectures

SECOND TERM:

1. **Ideal Cycles:** Otto, Diesel, Dual and Joule cycles, comparison of cycle efficiencies. 5 Lectures
2. **Vapour Cycle:** Carnot and Ranking cycle (use of Moller chart) 2 Lectures
3. **Non-reacting Mixtures:** Mixture of ideal gases, Dalton's law, mixture of ideal gases and vapour Psychometry, Adiabatic saturation temperature, dbt and wbt, Humidity degrees of saturations, use of Psychometric chart, processes including air-vapour mixtures, evaporative cooling. 7 Lectures
4. **Combustions:** Combustion processes, Strichiometric reaction equation, mass balance, complete and incomplete combustion analysis, enthalpy and internal energy of reaction, enthalpy of formations, flue gas analysis, Orsat apparatus, higher and lower heating values of fuels. 7 Lectures
5. **Fuel cells, solar cells and solar collectors M.H.D. conversion** 3 Lectures

BOOKS RECOMMENDED:

TEXT BOOKS

1. Engineering Thermodynamics by Balzihiser and M.R. Samuels

REFERENCE BOOKS:

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| 1. Thermodynamics | by F.W. Seers |
| 2. Thermodynamics | by R. Prasad and B.K. Singh |
| 3. Heat and Thermodynamics | by Zemsusky |
| 4. Thermodynamics | by Reynolds |

215 SOLID STATE PHYSICS AND DEVICES

FIRST TERM:

Semiconductor materials, growth of semiconductors, energy bands in solids, charge carries in semiconductors, excess carries in semi conductors, fabrication of p-n junction, forward and reverse biased junction, junction diode, tunnel diode, photodiode, light emitting diodes.

SECOND TERM:

BJT operation and fabrication, minority carrier, distribution, JFET, MOSFET, ICFET, MOS capacitor, MOSFET, UJT, P-N diode, silicon controlled rectifiers, (dv/dt and dv/dt effects), shorted cathode SCRs, diacs and triacs, ruby laser, semiconductor laser

TEXT BOOKS:

Solid State Electronics Devices by B.G. Streetman, Prentice Hall of India Pvt. Ltd

Physics of Semiconductor Devices by S.M. Sze, Wiley Eastern Ltd

216 DIGITAL ELECTRONICS

FIRST TERM:

Algebra for logic circuits: Logic variables: logic function- NOT, AND, NOR, XOR, Boolean algebra (Including Shannon's expansion theorem and consensus theorem): Canonical representations minterm, Families of logic circuits

Transistor Inverter, RTL, Diode logic, DTL, TTL brief Combinational circuits, Analysis and synthesis of Combinational circuits, Multiplexer, Encoder, Decoder, Code converter, Adder, Subtractor, comparator, Bit parity generator checker, priority encoder.

SECOND TERM:

Sequential circuits: 10 Lectures
Flip - FLOP-SR, JK, D, T
Registers- Buffer register, shift register
Counters-Asynchronous counter, Synchronous counter

Timing circuits: 5 Lectures
Digital to Analog converter (DAC) - weighted register method, R-2 R ladder method, Analog
to Digital converter (ADC) parallel comparator method, counter method, successive
approximation method,
Semiconductor memory:
Read only memory (ROM) - PROM, EPROM etc, Random Access memory (RAM) - static,
dynamic, organisation and application.

TEXT BOOK:

Taub & Schilling: Digital Integrated Electronic (Mc Graw Hill)

REFERENCE BOOKS:

M. Morris Mano: Digital Logic and Computer Design (Prentice Hall Of India)

ELECTRONICS AND COMMUNICATION ENGINEERING

THIRD YEAR

EC 301 INTRODUCTIONS TO MICROPROCESSOR

FIRST TERM:

- 8085 Architecture.
- Introduction, Pin functions, Internal Organisation.
- 8085 Programming :
- * Introduction, Programming model, Instructional timings.
- 8085 Interrupts:
- 8085 Interfacing with memory.

SECOND TERM:

- 8085 Interfacing with I/O
I/O ports, Data transfer schemes, supporting chips.
- 8085 Applications: Introduction, system Design examples, Development aid.
- Introduction to 8086 Architecture, Instruction Set

TEXT BOOKS:

Introduction to Microprocessors by A.P. Mathur

REFERENCE BOOK:

Microprocessor Architecture, programming and Applications with the 8085/8080 A
by R.S. Gaonkar

EE 302 INSTRUMENTATION – I

FIRST TERM:

- 1. System of units:** Fundamental and derived units, system International (S.I.) units Dimension.
- 2. Potentiometers:** D.C. Potentiometer, Crompton and Virnier types and their applications, self balancing (automatic) potentiometers, A.C. potentiometers, Co-ordinate and polar types and their applications.
- 3. Measuring Instruments:** Operation and construction of galvanometer, (d.c, and c.c.) Ammeters and voltmeters (Moving iron, moving coil and thermal) and wattmeter's (Dynamometer and induction types) Induction type energy meters, testing and compensation. Frequency-meters (Electrical resonance type), single phase and power factor meters, Muggers and multi meters.
- 4. Instruments transformers:** Current and potential transformers. Ratio and phase angle errors.

5. Measurement of resistances: Measurement of low resistance by Kelvin double bridge and potentiometer method, Measurement of high resistance by loss of charge method.

6. High voltage measurement: Surge and impulse test and oil testing set.

SECOND TERM:

1. Measurement of Induction and Capacitance: AC, bridges, Maxwell, Wien Anderson and shearing bridges General equations and vector diagram under balanced conditions, Errors and precaution in bridge measurements, Wagner's earth connection and shielding of bridge measurement, Wagner's earth connection and shielding of bridge elements.

2. Magnetic measurement: Ballistic galvanometers and flux meters. Measurement of flux by Ballistic galvanometers and flux meter, Determination of B-H curve and hysteresis loop, Separation of hysteresis and eddy current losses by using Lloyd Fisher square.

3. Electronic instruments: C.R.O. and its uses in measurement of frequency and phase angle, determination, B-H curve and measurement of die electric loss D.C. & A.C. voltmeters, Differential voltmeters A/D and D/A conveyors, Digital voltmeters and multi meters.

4. Measurement of Non-electrical Quantities: Primary sensing elements, classification and selection of transducers.

Displacement transducers, strain gauges, Temperature transducers and photoelectric transducers, Measurement of strain, temperature and pressure

TEXT BOOKS:

1. Electrical Measurement and Measuring Instruments by Rajendra Prasad (Khanna Publisher, Delhi)
2. Electronic Instrumentation and Measurement Technique by W. D. Cooper 7 A.D. Helfrick, Prentice Hall, India.

EE 303 ANALOG ELECTRONICS

FIRST TERM:

Analysis single stage small-signal amplifiers, multistage amplifiers Feedback amplifiers, power amplifiers.

SECOND TERM:

Tuned amplifiers, Oscillators, operational Amplifiers, modulation and demodulation, Rectifiers and power supplier

EE 304 SIGNALS & SYSTEMS

FIRST TERM:

- 1. SIGNALS & THEIR REPRESENTATION:**

Basic Continuous time Signals

Basic discrete time Signals

Linear time invariant Signals

Random Signals

2. INTRODUCTION TO LINEAR SYSTEMS:

Introduction

Linear system from a physical viewpoint

Linear system from a Mathematical view point

3. FOURIER SERIES & TRANSFORMS:

Fourier series expansion

Symmetry conditions

Exponential form of Fourier series

Fourier Integral & Fourier Transform

Analysis by Fourier Methods

Gibb's Phenomena

Concept of phase & Frequency spectrum

4. LAPLACE TRANSFORMS:

Introduction

Conversion from F-transform to L-transform

L-transforms of some important functions

The shifting Theorem & its applications

The gate function

L-transform of periodic functions

L-transform of operations

5. INVERSE LAPLACE TRANSFORMATIONS:

Introductions

Heaviside's expansion Theorem

Analysis of system response

Initial & Final Value Theorem

The Convolution integral

The Super position integral

Inverse L-transformations at some irrational functions

SECOND TERM:

6. SAMPLED-DATA SYSTEMS & THE Z-TRANSFORMATIONS

Introduction

The Z-transformations
Z-transformations of some important functions
The shifting Theorem
The initial & final value Theorem
Introduction to difference equations
Solution of difference equations Pulse transfer functions.

7. MATHEMATICAL MODELLING OF PHYSICAL SYSTEMS:

System response & transfer function
Block diagram representations
Rule for block diagram transformations Signal flow graph
Mason's gain formula & its applications

STATE VARIABLE REPRESENTATION:

Concept of state, state variable & state model, Difference between state variable & phase variable, state model for linear continuous time systems, Transition and resolvent matrix, Solution of State equations, Eigen values & given vectors

9. RANDOM SIGNALS:

Introduction Properties
Correlation of signal (Auto-correlation & cross-correlation), Gaussian probability density function-
Gaussian noise, white noise

10. NOISE—Introduction & type of noise

Noise figure, S/N ratio, Calculation of noise figure

BOOKS-TEXT/REFERENCE:

1. Analysis of linear systems— By D.K. Cheng.
2. Circuit & System Analysis— By A. Papoulis.
3. Signal & Linear system— By Gabel & Roberts.
4. Communication system— By Hawkins.
5. Communication system— By Kennedy.
6. Control System Engineering— By Nagrath & Gopal

EC 301 COMMUNICATION SYSTEMS

FIRST TERM:

- Review of signals and systems, Fourier Transforms
- Introduction to communication system
- Generation & Demodulation of AM signals including DSB-SC, SSB-VSB

- Frequency Division Multiplexing (FDM)
- Super-heterodyne & communication receivers
- Generations and demodulation of FM/PM signals
- Noise in AM/FM systems

SECOND YEAR:

- Pulse Modulation system, sampling theory.
- Generation & demodulation of PAM, PVVM & PPM
- Time division multiplexing (TDM)
- Antenna, transmission line & wave propagation (a introduction)
- Applications: (System description in brief)
 - AM/FM Radio Broadcasting & reception system
 - TV Broadcasting & reception system including colour TV
 - Line Communication (Telegraphy)
 - Telephony system including PBX & electronic exchanges
 - Microwave communication links
 - Satellite communication system
 - Radar, Navigation & Civil aviation communication systems
 - Power on line carrier communication system

TEXT:

1. Communications System by Kennedy
2. Electronics Communication by Rowdy Coleen
3. Telecommunication Principles Circuits and Systems by S. Ramabhadaram, Khanna Publications

EE 307 ELECTROMAGNETIC FIELD THEORY

FIRST TERM:

Concept of gradient, divergence and curl, Integral theorems, Coulomb's law, Gauss Law, Equipotential surface, Divergence theorem, Poisson's and Laplace's equation, solution of boundary value problems, evaluation of capacitance. Electrostatic energy, Electrostatic uniqueness theorem, Faraday's law, Magneto static energy, Ampere's laws, Magnetic vector and scalar potentials, Maxwell's equations, equation of continuity, Boundary conditions. Propagation of uniform plane waves, conductors and Dielectrics, Polarization.

SECOND TERM:

Reflection and refraction of plane waves, Brewster angle, surface impedance, Poynting, theorem, Power loss in a plane conductor, Transmission line equations, standing waves, Impedance matching, Transmission charts, Smith chart, Guided waves rectangular wave guides, wave impedances and characteristic impedances. Retarded potentials, Radiation from elementary dipole and half wave dipole, Radiation pattern

TEXT BOOKS:

Electromagnetic waves and Radiating Systems

By E.C. Jordan & K.G. Bamlain (Prentice Hall of India Pvt. Ltd)

EE 308 COMPUTERS PROGRAMMING (C LANGUAGE)

Variable names, Data types and sizes, constants, Declarations, Arithmetic Operations, Relations and Logic operators, Type conversions, Increment and decrement operators, Bitwise operators, Assignment operators and Expressions, Conditional Expressions, Procedure and order of Evaluation Statements and Blocks, Else-if with, Loops-while and For Loops-D-while, Break and continue, GOTO and Labels, Basic functions, Functions returning non-integers, External variables, Scope rules, Header Files, Static Variables, Register Variables. Block Structure, Initialization, Recursion Pointers and Addresses, Pointers and Function Arguments, Pointers and Arrays Address Arithmetic, Character Pointer and Functions, Pointer, Arrays Pointer to multidimensional, Arrays, command line Arguments, Pointers to function, Complicated declarations, Basics of structures, Structures and Functions Arrays of Structures, Pointers of structures, Self-referential structures, Table lookup, Typedef, Unions, Bit-fields, Standard input, and output Formatted Output prints, Variable-length Arguments Lists, Formatted input-Scant File Access, Line Input and output, Miscellaneous Functions.

TEXT BOOKS:

1. B.W. Kerningham & D.M. Ritchie-"The C Programming Language" Prentice Hall of India, New Delhi.
2. V. Krishnamurthy & K.R. Radhakrishnan-"Programming in C" Tata McGraw-Hill New Delhi, (c) Comparison of alternatives and replacement studies.

EE 310 PROGRAMMING METHODOLOGY AND DATA STRUCTURE

FIRST TERM:

Problem Analysis Algorithm and Flow chart specification, Introduction to PASCAL: Constants, variables, Expression, Logical operations and expressions, Looping and branching, statements, iteration and recursion, program, procedure and function structure, Array, record and pointer, file processing.

SECOND TERM:

Elementary Motions of analysis of algorithm - time space trade off, Sorting and Searching algorithms.

Data Structures

Arrays and ordered list

Stack and Queue

Linked list

Tree

TEXT BOOKS:

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|----------------------------------|---------------------|
| 1. Fundamental of data structure | By Horwiley & Sahni |
| 2. Computer Algorithm | by Horwiley & Sahni |
| 3. PASCAL | by Wirth |

EC302 PROGRAMMING C++

Data type, operators and statements, writing a program in C++, control statements, Function and programme structure, Lesion and bit fields, class and objects

TEXT:

Programming with C++ by P. Ravindram, TMH

EC 303 ADVANCE MICROPROCESSOR**FIRST TERM:**

8086 Architecture, 8086 programming, 8086 interfacing with memory and peripherals, introduction to 186/286/386/486 (with emphasis on feature)

SECOND TERM:

Bit sliced microprocessor, RISC processor, trouble shooting and development aids, application of microprocessors

TEXT:

1. Microprocessor: Comprehensive studies by Naresh Grover
2. Introduction to microprocessors by A.G. Mathur
3. Introduction to microprocessors by B. Ram

EC 304 COMPUTER SYSTEM ORGANIZATION**FIRST TERM:**

Introduction to Computer organization

Register transfer and micro-operations

Processor design

Processor organization, information types and their representation error detection and correction

Instruction types, format and addressing modes of modern digital computers and their effect on speed and performance

Fixed point arithmetic, ALU design, bit sliced, ALU, control unit design

Instruction sequencing and interpretation

Hardware control: design methods, multiplier control, CPU control unit

SECOND TERM:

Micro program control: CPU control unit, multiplier control unit, nonprogramming

Memory

Memory device characteristics, RAM, flip-flops and charge storage devices, 1D and 2D organization ferrite core, serial access memories, magnetic disk, magnetic bubble, CCD memories.

Virtual memory: memory hierarchies and design objective, address mapping, relocation, main memory allocation, segments and pages, Input/Output

I/O devices: punched tape/cards, keyboard, terminals, printers, CRI, I/O bus, programming and interrupt I/O processors, case study.

TEXT BOOKS:

1. Computer Architecture and organization by J.P. Hayes
2. Digital Computer Fundamentals by T.C. Bartee
3. Digital Computer Architecture by Morris Mano

ELECTRONICS AND COMMUNICATION ENGINEERING

FOURTH YEAR

EE 401 ENGINEERING ECONOMICS AND MANAGEMENT

FIRST TERM:

- 1. Engineering economy:** (a) Simple and compound interest, Annuities (b) Depreciation, Causes Methods, (c) Comparison of alternative and replacement studies, (i) Equivalent annual cost method, (ii) Present worth method, (iii) Rate of return method. 5 Lectures
- 2. Accounting:** (a) Double entry book keeping, (b) Journal (c) Ledgers, (d) Manufacturing Account: Profit and loss accounts, (e) Balance sheet. 7 Lectures
- 3. Costing:** (a) Cost and cost accounting elements of costs, (b) Break Even analysis determination selling price and profitability, (c) Overhead cost allocation, (d) Costing system. Job costing, unit costing, process costing, operating cost, departmental cost, (c) Cost control: Actual and standard cost, Budget and budgetary control. 7 Lectures
- 4. Entrepreneurship development:** (a) Introduction to Entrepreneurship (b) Motivation (c) Psychological factors. Risk taking behaviour, (d) Rural Entrepreneurship (e) Self employment.

SECOND TERM:

- 1. Management and organisation:** (a) Principle of management (c) Elements of management, planning, organising, direction and control, (c) Organisation structure and charts. Line, staff functional and committee organisation. 4 Lectures
- 2. Industrial management: Industrial ownership: Proprietorship Joint Stock Company and cooperative societies, (b) Site selection, (c) Plant layout: Press oriented, product orient Layouts, line balancing.** 4 Lectures
- 3. Production Materials Management:** (a) Production type, job order, balanced mass production, (b) Inspection and quality control, (c) Inventory control, economic order quantity. 4 Lectures
- 4. Optimization techniques:** (a) Linear programming: Graphical method, Analytical method of solution, (two variables) (b) CPM and PERT. 4 Lectures
- 5. Personal Management:** (a) Functions: recruitment, selection Training, promotion, discipline, welfare, (b) Job evaluation, (c) Merit Rating, (d) Wages and incentives. 4 Lectures
- 6. Marketing Management:** (a) Market research and sales force-casting, (b) Sales managements (c) Advertisement and sales promotion 4 Lectures

BOOKS RECOMMENDED:

1. **Engineering Economy:** By Carmo, Sallion and Canada (MacMillan) Publ. Co. New York, and Collier MacMillan Publishers, London.
2. **Industrial Organisation and management:** by Bethal, Atwater, Smith and Stackman (McGraw Hill Book Co.)
3. **Industrial Organisation and Engg. Economics :** by Banga and Sharma (Khanna Publishers Delhi)
4. **Industrial Accounting:** by O.P Khanna Dhanpat Rai and Sons, Delhi.
5. **Management Accounting:** by Anthony Robert N.
6. **Development of Entrepreneurship:** by Undai Pareek and T. Vankateshwara Rao (Sanjiv Pritery, Ahmedabad).

EE 402 POWER ELECTRONICS

FIRST TERM:

Power diodes, power transmitter, Thyristors G.T.O, Their characteristics, rating, protection and cooling, Series and Parallel operation of S£Rs. Firing and typical control circuits

Phase controlled converter: 1. Phase. 3-phase and polyphase, semi/Full, circuits with free-wheeling diode, Analysis and performance

Application: D.C. Motor control, Speed control of slip-ring I/M OPS.

SECOND TERM:

Voltage Controllers: 1- Phase/3 Phase, typical control for integral cycle control/phase control, application such as heater control, light dimmer.

Forced Commuted Convertors: Forced commutation circuits, Introduction to DC/DC Choppers, Classification control Sintegies, Multi-phase choppers, Application of Choppers for DC motor control.

DC/AC Inverters: Classification, Configuration, 1-phase/3-phase, VSI, PWN, CSI : Frequency and voltage control, Typical circuits, High frequency inverters, Application to AC motor control, UPS Induction heating.

TEXT BOOKS:

1. Thyristors and power Controllers Dubey, Daradia, Joshi, Sinha, Wiley Eastern.
2. Power Electronics and controls, Samir K. Data, Prentice-Hall of India.

REFERENCES:

3. Thyristors and their application, M. Ramamurthy
4. Power Electronics, D.A. Bradley, V.N.R. (U.K.) Co. Ltd

EE 406 AUTOMATIC CONTROL SYSTEMS

FIRST TERM:

1. Introduction and Type of feedback control system.
2. Mathematical modeling of physical system, linearization of non-linear system, Transportation lag.
3. Time domain analysis of control system.
4. Root-Locus techniques.
5. Frequency domain analysis of Control System.

SECOND TERM:

6. Time domain design of control system.
7. Frequency domain design of control system.
8. Controllers and their tuning.
9. Performance Index and Error criterion.

TEXT BOOKS:

1. Control systems Engineering— Nagrath, Gopal.
2. Automatic control system— Kuo.

EE 408 ADVANCE MICROPROCESSOR**FIRST TERM:**

8086 Architecture, 8086 programming, 8086 interfacing with memory and peripherals, introduction to 186/286/386/486 (with emphasis on feature)

SECOND TERM:

Bit sliced microprocessor, RISC processor, trouble shooting and development aids, application of microprocessors

TEXT:

1. Microprocessor: Comprehensive studies by Naresh Grover
2. Introduction to microprocessors by A.G. Mathur
3. Introduction to microprocessors by B. Ram

EC 401 COMPUTER NETWORKING**FIRST TERM:**

Network and its concepts, Advantage and disadvantages of networking, Network topology and mechanism, Circuit switching, data communication, Interface(FDDI), Transmission media, multiplexing, error detection, Ethernet (Gigabit Ethernet), High networking relay, ISDN, Types: of networks - LAN, its

types and protocol, physical layer, LAN Hardwares, LAN extenders, bridge routers, LAN Software, digitization of network, Wireless LAN Technology, Virtual private networks

SECOND TERM:

Metropolitans Area Network (MAN) and Wide Area Network (WAN), integrated server network, ATM and Sonnet/ SDE, Networking and internetworking devices, An overview on TCP/IP Network layer, Transport layer. Application layer Services, upper OSI layer.

TEXT:

1. Data Communication and networking By S. Jaiswal, Galgotia Publication Pvt. Ltd., ND
2. Computer Networks by Andrew S. Tanenbaum, PHI Edn

REFERENCE:

1. 'O' level, elective I Module M 1.1 Information Technology by V.K. Jain. BPB Publications, ND

EC 402 FIBRE OPTIC COMMUNICATION

FIRST TERM:

Fibre optic communication system, Fibre optic characteristic, Light Wave fundamentals, integrated optic waveguides, Optic fibre wave guide, Light Sources, Light Detectors.

SECOND TERM:

Compilers and converters, distribution networks and fibre components, Modulation, Noise and detection, System Design

TEXT:

1. Fibre Optic Communication by Joseph C. Palais, Pearson education Pvt. Ltd., ND
2. Optoelectronics and Fibres Optics Communication by C.K. Sarkar and D.C. Sarkar, New Age International

EC 403 SATELLITE COMMUNICATION

FIRST TERM:

Satellite Orbit, Kepler's Law, Synchronous, Sub synchronous and nonsynchronous type satellites, characteristic of radio system, Methods of Modulation, Noise consideration, Remote Area communication through satellite, Insat systems and their characteristics.

SECOND TERM:

Attitude control, Satellite station keeping, Limits of visibility, Frequency and polarization, Transponders, uplink and downlink, power budget calculation, multiple access method, brief introduction to digital communication by satellite.

TEXT:

1. Electronics Communication By Rowdy and Colin, PHI, ND
2. Telecommunication, Principles, Circuit and systems
By Ramphadram, Khanna Publishers
3. Digital Communication by Satellite
By Spiker PHI (1994 Edn.)

EC 404 DIGITAL SIGNAL PROCESSING**FIRST TERM:**

Discuss time signals and system, stability and causality of linear shift invariant system, Z-transform, flow graph and representation of digital filters, effect of quantization of parameters, digital filter design.

SECOND TERM:

FIR filter: design based on analog filters, input invariance and bilinear transformation approach, computer aided design.

FIR filters: design windows, computer aided design, computation of DFT and FFT algorithm, effect of finite register length in digital signal processing.

TEXT BOOK:

DIGITAL Signal Processing by Allan V. Oppenheim and Ronald W. Schaffer, Prentice Hall of India

EC 406 COMPUTER COMMUNICATION AND NETWORKS**FIRST TERM:**

Data transmission principle, transmission components, modern error control and line control procedures, role of computer for data communication, computer communication- point to point multi drop, concept of circuit message and packet switching computer networking their structure (centralized, hierarchical distributed, multistar, ring etc.)

SECOND TERM:

Components of computer network, hosts, FEP, communication channel, terminals, multiplexes, concentrators etc, routing and flow control, network software, security, reliability, statistics and accountability case study of computer communication network.

REFERENCES:

1. A.S. Tanenbaum, Computer Networks, Prentice Hall 1981
2. D.W. Davis, D.L.A., Barber, W.L. Price and C.M. Solomon, Computer Networks and their protocols John Wiley, 1979

EC ADVANCED E.M.F. THEORY**FIRST TERM:**

1. **RADIATION:** Vector potential in the electromagnetic field, oscillation, electric dipole and power- radiated application to short antenna, radiation from a half dipole and its radiation resistance.
2. **ANTENA FUNDAMENTALS:** Radiation pattern, antenna gain, effective joint of an antenna, antenna aperture, relation between antenna gain and antenna aperture, elementary idea of self and mutual impedances in antenna, antenna terminal impedance, reciprocity theorem of an antenna.
3. **ANTENNA ARRAYS:** Arrays of two point source linear arrays of n-point sources, broad side and end fire arrays, pattern multiplication binomial arrays.
4. **SPECIAL PURPOSE ANTENNAS:** Loop antenna travelling wave antenna, rhombic antenna, Yagi antenna, Horn and reflector type antennas.

SECOND TERM:

1. **GROUND WAVE PROPAGATION:** Introduction to different region of the atmosphere, various propagation paths, basic ideas of ground wave propagation, space wave and surface wave, true troposphere refraction, radius of curvature of a ray in the troposphere, concept of modified earth, duct propagation.
2. **SKY WAVE PROPAGATION:** Structure of the ionosphere, effective permittivity and conductive of an ionized region, effect of earth magnetic field, critical frequency, MUF and OPWF, virtual height, skip distance fading.
3. **ANTENNA DESIGN:** Design consideration for antennas at various frequency domains, common type of antennas in different frequency domains e.g. Wide band antenna

TEXT BOOK:

Electromagnetic waves and radiating system by Jordan

REFERENCE:

Electromagnetic by Krauss J.D.F., Mc Graw Hill

EC 408 DESIGNING WITH ICs

FIRST TERM:

LINEAR IC DESIGN:

- Linear circuit application, amplifiers, DC amplifiers, bridge amplifiers, integrators, differentiators, AC coupled feedback amplifiers, voltage to current converters, reference voltage sources and voltage regulators, current amplifiers, charge amplifiers.
- Non-linear circuit application, limit network, feedback limiters, diode function generators, logarithmic amplifiers.
- Active filters, active filter characteristics, pole pairs, network functions and parameters of low pass, high pass, band pass and band reject, filter realization

- Wave form generators, square wave, triangle wave and sine wave generator, use of 555 timer
- Miscellaneous circuits: VCO, VFC, FLL etc

SECOND TERM:

DIGITAL IC DESIGN:

- Review of logic families, their characteristics and interfacing
- Designing with counters and shift register
- Construction and debugging of IC circuits
- Arithmetic circuits
- Memories
- Basic Computer

BOOKS:

1. Operational Amplifiers: Design and Applications Editors: Tobrey-Graeme Huelsman, Mc Graw Hill
2. Practical Digital Design Using ICs by Joseph D Greenfield, John Wiley & Sons, 1983

EC 409 ELECTRONIC INSTRUMENTATION

FIRST TERM:

- Review of industrial electronic instrumentation system
- Elements, functions and application of measurement system
- Standard of measurement
- Performance characteristics of electronic instruments, error in measurements and their statistical analysis
- Transducers, principle and operation of transducers used for measurement of electrical and non-electrical parameter
- Analog and digital acquisition system
- Bridges, electronic amplifiers and precision, rectifier, linearization circuits, filters, voltage to current converters, current to voltage to frequency and frequency to voltage converter circuits

SECOND TERM:

- Electronic indication, display, recording, analog and controlling instruments
- Electronic voltmeter, CRO, counters
- LCD-LED display devices and monitors
- Analog and digital recorders
- Function generators

- Wave analyzer
- Q meters
- P, PI, PID type controllers
- Power supply calibrating sources
- Computer controlled instruments and interfacing techniques
- Application of electronic instruments
- Communication system
- Power generating, monitoring and distribution system
- Process control instrumentation system
- Wave from generators, square wave, triangle wave and sine wave generator, use of 555 timer
- Miscellaneous circuit: VCO, VFC, PLL etc

TEXT BOOK:

1. Electronic Instrumentation by A.P. Malvino
2. Electronic Instrumentation & Measurement Technique by W.D. Cooper and A.D Helfrick(PHI)

REFERENCE BOOK:

1. Electronic measurement & Instrumentation by R. Prasad (Khanna Publication)

EC 410 DIGITAL COMMUNICATION AND MODULATION

FIRST TERM:

1. **SPECIAL ANALYSIS:** Correlation between wave forms power and cross correlation, auto correlation, auto correlation of a periodic waveforms
2. **RANDOM VARIABLES:** Introduction, discrete and continuous, random variables, cumulative distribution function, probability density function, relation between probability and probability density, joint cumulative distribution and probability density, random processes.
3. **DIGITAL MODULATION TECHNIQUES:**
 - i. Binary phase shift keying- generation and reception
 - ii. Differential phase shift keying- generatic a DPSK signal, recovering data from the DPSK signal
 - iii. Quadrate phase shift keying: Principle of generation of QPSK signal, QPSK receiver
 - iv. Binary frequency shift keying: Generation of BFSK signal, receiver for BFSK signal
4. **MULTIPLEXING PCM SIGNALS:** The TI digital system

SECOND TERM:

1. **Base band signal receiver:** Concept of the matched filter, pulse response and probability of error of the matched filter.
2. **Coding:**
 - i. Coding to increase average information per bit- Shannon Fano Algorithm
 - ii. Coding for error detection: Hamming distance
 - iii. Introduction to voice coders: channel Voice coders, Speech model used in voice coders
3. **Fundamentals of Telephone Switching:**

Elemental phone switching, central switching, time slot interchanging, space switching, space array for digital signals, combined space and tune switching, mobile telephone communication – The Cellular

TEXT BOOK:

Digital Communication by B.P. Lathi

EC 411 COMPUTER AIDED DESIGN AND ROBOTICS

Introduction: Concept of CAD/DAM

Computer System, Computer aided Design system, Hardware, Computer Aided design system, Software transformation systems Geometric modeling draughting Applications of CAD/CAM techniques to finite element data preparation. Computer Aided Manufacture the APT System CNC DNC system, the use of Micro-computers in CAD/CAM system. Industrial Robotics Automated guided vehicles, Process planning Materials management planning Implications of CAD/DAM for industry.

BOOKS:

1. Computer Aided Design and Manufacture By C.B. Besant & C.W. K LW
2. Principle of Computer aided Design By Joe Rooney & Philip Steamman
3. Computer Aided Design and Manufacture CAD/CAM - Groover & Jinner