# Course Structure and Syllabi for

# B.Tech (4 Years Course)

# in

# Electronics and Communication Engineering

# Effective from

# Academic Session 2011-12

**SCHEME OF COURSES FOR B.TECH Electronics and Communication Engineering I$^{ST}$ YEAR**

**B.Tech I year, I Semester**

| Sl. No. | Course No. | Subject | Credits | Teaching Schedule Hrs. LTP | Total |
|---|---|---|---|---|---|
| 1. | PH-101T | Engineering Physics-I | 4 | 310 | 4 |
| 2. | CY-101T | Engineering Chemistry | 4 | 310 | 4 |
| 3. | MA-101T | Engineering Mathematics-I | 4 | 310 | 4 |
| 4. | HU-101T | Communicative English | 3 | 210 | 3 |
| 5. | CS-101T | Computer Fundamentals & Programming | 4 | 310 | 4 |
| 6. | ME-107 T | Engineering Graphics | 2 | 120 | 3 |
| 7. | EE-101T | Basic Electrical Engineering (EE, EI & EC) | 4 | 310 | 4 |
| 8. | EI-101T | Basic Electronics Engineering (ME, CS & CH) | 4 | 310 | 4 |
| 9. | CY-103T | Environments Studies (EE, EI & EC) | 2 | 300 | 3 |
| 10. | HU-103T | Engineering economics (ME, CS & CH) | 2 | 300 | 3 |
| | | **Total** | **20/21** | | **22/22** |
| **Laboratory Courses** | | | | | |
| 11. | PH-101P | Physics Lab(EE, EI & EC) | 2 | 003 | 3 |
| 12. | CY-101P | Chemistry Lab (EE, EI & EC) | 2 | 003 | 3 |
| 13. | CS-101P | Computer Lab (CS, CH & ME) | 2 | 003 | 3 |
| 14. | EE-101P | Basic Electrical Engg. Lab (EE, EI & EC) | 2 | 003 | 3 |
| 15. | EI-101P | Basic Electronics Engg. Lab (CS, CH & ME) | 2 | 003 | 3 |
| 16. | ME-101P | Workshop Practice (CS, CH & ME) | 2 | 003 | 3 |
| | | **Total** | **6/6** | | **9/9** |
| | | **G. Total** | **26/27** | | **31/31** |

**B.Tech I year II Semester**

| Sl. No. | Course No. | Subject | Credits | Teaching Schedule Hrs. LTP | Total |
|---|---|---|---|---|---|
| 1. | PH-102T | Engineering Physics-II (All Branches) | 4 | 310 | 4 |
| 2. | MA-102T | Engineering Mathematics-II (All Branches) | 4 | 310 | 4 |
| 3. | EE-102T | Basic Electrical Engineering (CS, CH & ME) | 4 | 310 | 4 |
| 4. | EI-101T | Basic Electronics Engineering (EE, EI & EC) | 4 | 310 | 4 |
| 5. | CY-101T | Engineering Chemistry (CS, CH & ME) | 4 | 310 | 4 |
| 6. | HU-101T | Communicative English (EE, EI & EC) | 3 | 210 | 3 |
| 7. | CS-101T | Computer Fundamentals & Programming (EE, EI & EC) | 4 | 310 | 4 |
| 8. | ME-107T | Engineering Graphics (ME, CS & CH) | 2 | 120 | 3 |
| 9. | CY-103T | Environmental Studies (ME, CS & CH) | 2 | 300 | 3 |
| 10. | HU-103T | Engineering Economics (EE, EI & EC) | 2 | 300 | 3 |
| | | **Total** | **21/20** | | **22/22** |
| **Laboratory Courses** | | | | | |
| 11. | PH-101P | Physics Lab (CS, CH & ME) | 2 | 003 | 3 |
| 12. | CY-101P | Chemistry Lab (CS, CH & ME) | 2 | 003 | 3 |
| 13. | CS-101P | Computer Lab (EE, EI & EC) | 2 | 003 | 3 |
| 14. | EE-101P | Basis Electrical Engineering Lab (ME, CS & CH) | 2 | 003 | 3 |
| 15. | EI-101P | Basic Electronics Engineering Lab (EE, EI & EC) | 2 | 003 | 3 |
| 16. | ME-101P | Workshop Practice (EE, EI & EC) | 2 | 003 | 3 |
| | | **Total** | **6/6** | | **9/9** |

| | | | | | |
|---|---|---|---|---|---|
| | | **G. Total** | **27/26** | | **31/31** |

## III Semester

| S.No | Subject code | subjects | Teaching schedule | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1. | EC-201T | Electronics engineering materials | 3 | 1 | 0 | 4 |
| 2. | EC-203T | Electromagnetic theory | 3 | 1 | 0 | 4 |
| 3. | EI-201T | Analog electronics | 3 | 1 | 0 | 4 |
| 4. | EI-203T | Electronic measurement and instrumentation | 3 | 1 | 0 | 4 |
| 5. | EE-203T | Network analysis & Synthesis | 3 | 1 | 0 | 4 |
| 6. | MA-201T | Engineering Mathematics-III | 3 | 1 | 0 | 4 |
| 7. | EC-201P | Electronic devices lab | 0 | 0 | 3 | 2 |
| 8. | EC-203P | Electronic circuit lab | 0 | 0 | 3 | 2 |
| 9. | CS-201P | Computer programming lab-II | 0 | 0 | 3 | 2 |
| **Total Credits** | | | | | | **30** |

## IV Semester

| S.No | Subject code | subjects | Teaching schedule | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1. | EC-202T | Signal and System | 3 | 1 | 0 | 4 |
| 2. | EC-204T | Digital Electronic | 3 | 1 | 0 | 4 |
| 3. | EI-202T | Leaner Integrated Circuits | 3 | 1 | 0 | 4 |
| 4. | ME-212T | Industrial Management | 3 | 1 | 0 | 4 |
| 5. | CS-204T | Computer Organization | 3 | 1 | 0 | 4 |
| 6. | EE-202T | Element of Electrical Machines | 3 | 1 | 0 | 4 |
| 7. | EI-202P | Leaner Integrated Circuit Lab | 0 | 0 | 3 | 2 |
| 8. | EC-204P | Digital Electronics Lab | 0 | 0 | 3 | 2 |
| 9. | EE-202P | Electrical Machine Lab | 0 | 0 | 3 | 2 |
| **Credits** | | | | | Total | 30 |

## V Semester

| S.No | Subject code | subjects | Teaching schedule | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1. | EC-301T | Analog Communication Systems | 3 | 1 | 0 | 4 |
| 2. | EC-303T | Antenna And Wave Propagation | 3 | 1 | 0 | 4 |
| 3. | EC-315T | Consumer Electronics | 3 | 1 | 0 | 4 |
| 4. | EI-301T | Microprocessor and Their Applications | 3 | 1 | 0 | 4 |
| 5. | EE-301T | Control System | 3 | 1 | 0 | 4 |
| 6. | EE-303T | Power Electronics | 3 | 1 | 0 | 4 |
| 7. | EC-301P | Analog Communication Lab | 0 | 0 | 3 | 2 |
| 8. | EI-301P | Microprocessor Lab | 0 | 0 | 3 | 2 |
| 9. | EE-303P | Power Electronics Lab | 0 | 0 | 3 | 2 |
| **Total Credits** | | | | | | **30** |

## VI Semester

| S.No | Subject code | Subjects | Teaching schedule | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1. | EC-302T | Digital Signal Processing | 3 | 1 | 0 | 4 |
| 2. | EC-304T | Digital Communication System | 3 | 1 | 0 | 4 |
| 3. | EC-308T | Microelectronics | 3 | 1 | 0 | 4 |
| 4. | EC-306T | RADAR And Navigational Aids | 3 | 1 | 0 | 4 |
| 5. | CS-302T | Data Network & Computer Network | 3 | 1 | 0 | 4 |
| 6. | EI-302T | Microcontroller & Embedded System | 3 | 1 | 0 | 4 |
| 7. | EC-304P | Digital Communication Lab | 0 | 0 | 3 | 2 |
| 8. | EI-302P | Microcontroller Lab | 0 | 0 | 3 | 2 |
| 9. | EE-301P | Control System Lab | 0 | 0 | 3 | 2 |
| | **Total Credits** | | | | | **30** |

# VII Semester

| S.No | Subject code | subjects | Teaching schedule | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1. | **EC-415T** | Mobile communication | 3 | 1 | 0 | 4 |
| 2. | EC-403T | VLSI design &circuit | 3 | 1 | 0 | 4 |
| 3. | EE-405T | Microwave engineering | 3 | 1 | 0 | 4 |
| 4. | ..... | Pool elective | 3 | 1 | 0 | 4 |
| 5. | ..... | Open elective | 3 | 1 | 0 | 4 |
| 6. | EC-407T | Industrial training | 0 | 0 | 3 | 2 |
| 7. | EC-409T | seminar | 0 | 0 | 3 | 2 |
| 8. | EC-401P | Digital signal processing Lab | 0 | 0 | 3 | 2 |
| 9. | EC-403P | Product design Lab | 0 | 0 | 3 | 2 |
| 10. | EC-405P | Project-I | 0 | 0 | 3 | 2 |
| | | | | **Total Credits** | | **30** |

**Pool elective** :

1. EC-433 Digital system design
2. EC-452T PC Interfacing
3. ME-473T Work Study
4. CS-402T Multimedia
5. EI-451T PCB Design & Technology

**Open elective :**

1. PH-419T Futuristic material
2. MA-491T Operation research
3. CY-401T Polymeric Materials and their Applications

# VIII Semester

| S.No | Subject code | subjects | Teaching schedule | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1. | EC-436T | Optical fibre communication | 3 | 1 | 0 | 4 |
| 2. | EC-456T | Satellite communication | 3 | 1 | 0 | 4 |
| 3. | ..... | Pool elective | 3 | 1 | 0 | 4 |
| 4. | ..... | Open elective | 3 | 1 | 0 | 4 |
| 5. | EC-404 P | Microwave Lab | 0 | 0 | 3 | 2 |
| 6. | EC-402P | Project -II | 0 | 0 | 3 | 10 |
| **Credits** | | | | **Total** | | **28** |

**Pool elective** :

1. Digital Image Processing EC-458T
2. Microwave Communication EC-450T
3. DSP Processors and Architecture EC-462T
4. Fuzzy Logic and Neural Networks EI-412T

**Open elective** :

1. HU-402T Engineering economics
2. HU-449T Principle of Management
3. PH- 429T Material Imperfection and Applications
4. HU-409T Quantitative Methods in Economics
5. HU-407T Foreign Trade

## B.Tech. FIRST YEAR (FIRST SEMESTER)

**PH-101** **Physics-I** **Credits-4 LPT(310)**

**Interference:** Coherent sources, Theory of interference, displacement of fringes, Fresnel's biprism experiment, Interference in thin film, wedge shaped film, Newton's rings.

**Diffraction:** Basic idea of Fresnel & fraunhofer diffraction, single, double and n slit diffraction, diffraction grating, Rayleigh's criterion of resolution, resolving power of telescope, microscope and grating.

**Polarization:** Phenomenon of double refraction, Malus law, Nicol prism, quarter wave and half wave plates, production and analysis of plane, circularly and elliptically polarized light, optical activity, specific rotation, Lorentz half shade and biquartz proarimeters.

**Wave Mechanics:** Elementary idea of quantization, black body radiation, Frank-Hertz experiment, Photoelectric effect. Wave particle duality, De Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrodinger's wave equation, physical significance of wave function, applications of Schrodinger's wave equation: (i) Particle in one dimensional box. (ii) Potential Step (iii) Potential barrier-quantum mechanical tunneling (Basic idea).

**Solid State Physics:** Structure of crystalline solid: Lattice translational vectors, unit cell, Bravais lattice, Miller indices and simple crystal structures.

Free electron model: Free electron gas in one and three dimensions, Fermi energy, Density of states, Heat capacity of the electron gas, failure of free electron model.

Band theory: Kronig Penny model, motion of electrons in one dimension according to the band theory, effective mass of an electron, concept of hole, distinction between metals, insulators and intrinsic semi-conductors.

**Books:**


**1)** Geometrical & Physical Optics: B.K.Mathur
**2)** Introduction of Solid State Physics: C. Kittel
**3)** Solid State Physics: A.J. Dekkar
**4)** Quantum Mechanics: Singh and Bagdel
**5)** Optics: Ajai Ghatak
**6)** Quantum Mechanics: B.K. Agarwal & Hari Prakash
**7)** Optics: A.H. Flower
**8)** Geometrical & Physical: Zenkin's & White
**9)** Quantum Mechanics: Eisberg


**Chemistry**

**CY-101** **LPT(310)**

**Schrődinger equation:** origin of quantization; applications of particle in a box problem; hydrogen atom; properties of atomic orbitals; many electron atoms; molecular orbital theory; bonding and intermolecular forces. **Thermodynamics:** Fundamental definition and concepts of thermodynamics; Work, heat and energy; First law: *Cp* and *Cv*; Second law: entropy; Helmholtz and Gibbs Energy; chemical potential; Third law; phase equilibria; chemical equilibrium. **Chemical kinetics:** Rate laws; elementary reaction and chain reaction. **Periodic table and periodic properties:** basis of periodic table, trends in size, electron affinity, ionization potential and electro negativity, Use of Ellingham diagram and thermodynamics in the extraction of elements; Transition metal chemistry: inorganic complexes, isomerism, nomenclature; bonding in transition metal complexes; valence bond and crystal field theory, magnetism, bonding aspects, structural distortion; Bioinorganic chemistry: storage and transport proteins; Catalysis: hydrogenation, hydroformylation and olefin metathesis. **Organic Chemistry:** Hűckel treatment of ethylene, butadiene and benzene, concept of aromaticity, configuration, molecular chirality and isomerism, conformation of alkanes and cycloalkanes, reactivity of carbonyl groups (additions, addition-eliminations, reactions due to acidic proton, reactivity of acid halide, ester and amide), functional group inter-conversions involving oxidation and reduction. Introduction to bio-organic chemistry: carbohydrates, amino acids proteins and nucleic acids. Polymer chemistry definition, classification of polymers, orientation of polymers, types of polymerization, Mechanism of addition and condensation polymerization, thermo plastic and thermo setting revius: Important thermosetting and thermoplastic polymers: eg. Bakelite, polyester, cellulose derivatives, PVC, Poly ethylene, Teflon, Polystyrene, Nylon Natural and synthetic rubbers.

**Suggested Books**


1. P.W. Atkins, **Physical Chemistry** (7th Edition), Oxford University Press, 2006.
2. I. A. Levine, **Physical Chemistry**, McGrawHill, 2009
3. D.A. McQuarrie and J.D. Simon, **Physical Chemistry -a Molecular Approach**, Viva Books Pvt. Ltd., 1998.
4. R.T. Morrison and R.N. Boyd, **Organic Chemistry**, Prentice Hall of India Pvt. Ltd., 5th Ed, 1990
5. G. Solomons and C. Fryhle, **Organic Chemistry**, John Wiley & Sons (Asia) Pte Ltd.
6. J.D. Lee, **Concise Inorganic Chemistry**, (5th Edition), ELBS, 1996.
7. D. F. Shriver and P. W. Atkins, **Inorganic Chemistry,** Oxford University Press, 2006
8. F.W.Bill mayer, Polymer Science, Tata McGraw Hill.


# B.Tech. First Semester

# Paper: Mathematics-I

# Paper Code: MA-101

Note: A setting of eight questions will be there covering all the units proportionally out of which any five are to be attempted.

UNIT:1 **Differential Calculus:** Limit, continuity and differentiability of functions of single variable. Successive, Differentiations, Leibnitz Theorem, Expansion of functions by Maclaurin's and Taylor's theorems.

Functions of several variables: Partial derivatives, Euler's theorem, change of variables, total differential coefficients, maxima and minima, Lagrange's method of multiplier.

UNIT:2 **Integral Calculus:** Fundamental and mean value theorems of integral calculus. Reduction formulae, Walli's formula, Beta and Gamma functions, Double and Triple integrals, change of orders of integrations. Area enclosed by plane curves, surfaces and volumes of revolutions.

UNIT:3 **Vectors and Matrices:** Differentiations and integrations of vectors. Gradient, Divergence and Curl. Vector identities, Green's, Gauss's and stoke's theorems with applications.

Types and algebra of matrices, rank, solution of simultaneous linear equations, Eigen values and Eigen vectors, diagonalisation of matrices, Cayley-Hamilton Theorem.

References


1. E.Kreyszig: Advance Engineering mathematics, John Wiley & Sons, 2005.
2. B.V.Ramana: Higher Engineering Mathematics, Tata McGraw Hill Co. Ltd., 2008
3. R.K.Jain & S.R.K. Iyenger: Advance Engineering Mathematics, Narosa Publishing House, 2002.
4. J.C. Sharma: Vector Algebra, Students & Friends Co. Ltd. Agra.
5. J.K.Goel & K.P.Gupta: Matrix algebra, Students & Friends Co. Ltd. Agra.
6. H.K.Dan: Advanced Engineering Mathematics.

**English Language and Literature Lab**

**HU 101 LPT 310**

This course has a double purpose. It introduces literature and its forms and also helps students learn the English language. The linguistic aspect will be dealt with by concentrating on the

dictionary skills and introducing principles of pronunciation, vocabulary development, and syntax. The main topics include:

(a) **Pronunciation:** basic sounds of English (vowels and consonants) and word-stress

(b) **Vocabulary:** word-formation (prefixes and suffixes),synonyms and antonyms

(c) **Syntax:** parts of speech, active and passive voice, direct and indirect speech, tenses, basic sentence patterns, etc. The literary aspect will be dealt with through suitable texts such

as poems, short stories and plays (chosen be the instructors). The main topics for discussion will be:

(a) What is literature?

(b) The nature of literary language (mainly "figurative "language)

(c) The literary forms or genres

(d) Literature and socio-cultural context

Pre-Requisities of Scientific Writing: Salient features: BOCUST formula.Grammaticalpre-requisites: Usage, Sentence fragments, questions tag. Modifiers, connectives Split infinitives, Dangling participle Gereunds, ellipsis coherence & unity: Method.

**CS-101 Computer Fundamental & Programming Credits 2(3-0-0)**

**UNIT 1: Introduction to Computers:** Basic definition, Generation, Classification of computers, Introduction to Computer architecture. **Number Systems:** Introduction, Classification- Decimal, Binary, Octal, Hexa Decimal, and their convertibility, Data representation, ASCII, BCD, Gray Code. **Input/Output:** Input System, Input device- Keyboard, Mouse, Joystic, Lighten, MCR MICR,Touch Screen, Graphic Tablet, Voice Input System, Output System, Output Devices-VDU, Printers, Plotters.

**UNIT 2: Planning The Computer Program:** Purpose of program planning, Algorithms, Flowcharts, Decision Tablets, Pseudo code. **Memory:** Introduction, Characteristic, Main Memory, secondary memory, Back- Up Memory, Cache Memory, Primary Memory, Semiconductor Memory, Memory Management Unit.

**UNIT 3: Basic Operating System Concept:** MS-DOS, WINDOWS, Introduction to basic commands Of DOS, Evolution of Operating Systems, Batch Processing, Spooling, Multiprogramming, Multiprocessing, Time Sharing, On Line Processing, Real-Time Processing, Introduction to Internet, Basic Terms related with internet.

**Computer Software:**

Introduction to Software, Relationship between Hardware and Software, Types of Software, Acquiring software, Firmware.

**UNIT 4: Programming in C:** History, Introduction to C Programming, Language, Structure of C Programs, Compilitation and Execution of C Programs, Debugging Techniques, Data Type and sizes, Declaration of Variables, Modifiers, Identifiers and Keywords, Symbolic constants, Storage Classes( Global, Automatic, External, Register, And Static), Enumerations, Command line Parameters, Macros, The C Preprocessors.

**UNIT 5: Operators:** Unary Operators, Arithmetic and Logical Operators, Bit wise Operators, Assignment Operators, Expressions, Conditional Expressions, Precedence and order of evaluation. **Control Statements:** if-else, switch, break, continue, the comma operator, Goto statement. **Loops:** for, while, do-while. **Functions:** Built-in and user-defined, Function declaration, Definition and Function call, parameter passing, call by value, Call by reference, Recursive Functions, Multifile programs. **Arrays:** Linear Arrays, Multidimensional Arrays, Passing array to functions, Arrays of strings.

**UNIT 6: Structure And Union:** Definition and differences, Self-referential Structure. **Pointers:** Introduction, Accessing the address of a variable, Declaring & Initializing pointers, Accessing a variable though in pointer, Pointers and Arrays, Pointers and character strings, Pointers and functions.

**References:**

**1)** Computers Fundamental by Rajaraman
**2)** Computers Fundamental by B. Ram.
**3)** Computers Fundamental by P.K. Sinha.
**4)** 'Programming in C' by E. Balagrusamy, TMIL.
**5)** 'Let Us C' by Yashwant Kanetkar, Narosa.
**6)** Exploring 'C' by Yashwant Kanetkar

**ME-101** **MANUFACTURING TECHNIQUES**

| **Credit:02** | **L** | **T** | **P** | **Total** |
|---|---|---|---|---|
| **Max. Marks:** | **2** | **0** | **0** | **02** |

Unit:1 **Carpentry:-**

Wood, timber-exogenous & endogenous, Cross section of an exogenous tree, Seasoning of wood, Seasoning methods, defects (Both natural and that occurs during conversion), Brief description of carpentry tools, various carpentry process. Carpentry joints.

Unit:2 **Pattern & Pattern making:-**

Pattern, types of pattern (Single piece, split, Match plate, Sweep, Loose piece, Gated patterns), Pattern making allowances, Design considerations in pattern making, pattern making materials, Core prints.

Unit:3 **Foundry:-**

Moulding materials, types of foundry sands; characteristics of foundry sands; Binders & additives; moulding procedures: Floor moulding, Bench moulding, Pit moulding, Machine moulding, Green sand moulding, Dry sand moulding, $CO_2$, Core making processes.

Unit:4 **Foundry' tools & equipments:-**

Tools used in foundry (hand tools); moulding machine- (Jolt machine, Squeezing machine, Sand Slinger, Push off machine), Furnaces (Pit furnace, cupola furnace).

Unit:5 **Welding:-**

Welding: Pressure and non-pressure, arc welding (AC and DC arc welding, Introduction to Carbon arc welding, metal arc welding, TIG & MIG welding); Electric resistance welding (Spot, seam, projection, But, thermit welding), welding tools and equipments, Gas welding (oxyacetylene).

Unit:6 **Bench work & fitting:-**

Tools (holding tools, striking tools, cutting tools), various operations performed in fitting shop

(detailed).

Unit:7 **Machine tools: Definition, types.**

Lathe specifications; Lathe operations in brief (facing, plain turning, step turning, taper turning, threading, drilling and boring). Milling machine (introduction & brief description of operations only).

Unit:8 **Jigs & Fixture:** Introduction, Location points, Basic Design of Jigs & Fixture, Types of Jigs & Fixture.

**Text Book:**

A text Book on workshop technology by B. S. Raghuvanshi

**Reference Book:**

Workshop technology by Hazara & Chaudhry,

Production technology by R.'K.Jain

| | | | | | |
|---|---|---|---|---|---|
| **ME-103** | **ENGINEERING** | **GRAPHICS (I year: I Sem)** | | | |
| **Credits: 03** | | **L** | **T** | **P** | **Total** |
| **Max. Marks:** | | **1** | **2** | **0** | **03** |

Unit:1 Importance of Engineering Drawing, Engineering Drawing Instruments and uses, Layout of Drawing sheet, Lettering and Dimensioning, Types of Lines. Scales: What is scale, Representative factor, Types of Scale: Plain, Diagonal and Vernier scales, Metric Measurements and conventions, Plain Scale, diagonal scale& vernier scale(forward & backward both).

Unit:2 Conic Section, Definition, and different methods of construction of ellipse, hyperbola and parabola by Eccentricity method Construction of parabola and ellipse by Concentric circles method, Oblong method, Parallelogram method.

Unit:3 Projections, Principle, types and conventions, Theory of Projections and orthographic projections:- Introduction, Types of projections, Orthographic projections, Planes of Projection, Four quadrants, Types of orthographic projections, (a) Projections of point and straight lines, (b) Projections of lines inclined to both the planes, Projection of planes, (a) Projection of solids (b) Projection of solids inclined to both H.P. & V.P. (of prisms pyramids etc).

Unit:4 Isometric Projections: Theory of isometric projection- Isometric lengths, Isometric scales:- Methods to draw Isometric view or projection, various positions of Isometric axes. Isometric projection with isometric lines, non-isometric lines and with curved & circular surfaces.

**Recommended Text Book**

1. A Text book of Engineering Drawing (Geometrical Drawing) by R.K. Dhawan
2. Engineering Drawing & Graphics, by K.Venugopal Rao
3. Engineering Drawing by P.S. Gil
4. Engineering Drawing by N. D. Bhatt

***Subject: Basic Electronics*** ***Code: EI-101T*** ***Credits: 4***

***Branches: all branches*** ***Sem: I/II Semester*** ***L P T: 3 1 0***

**Unit 1:- Introduction of Semiconductor Physics:** Band Theory of solids, Insulator, Semiconductor & Metals, Mobility and Conductivity, Electrons and holes in an intrinsic semiconductor, Carrier concentration in an intrinsic semiconductor, n-type material, p-type material, Donor and Acceptor impurities, Charge densities in a semiconductor, Hall-effect, Diffusion, the continuity equation, Fermi level in a semiconductor having impurities.

**Unit 2:- Junction Diode Characteristics:** p-n junctions, Forward bias, Reverse bias junction, V-I characteristics, Effect of temperature on a p-n junction diode, Maximum temperature operation, Reverse breakdown voltage, Capacitive effects in a p-n junction diode, Space charge capacitance, Diffusion capacitance, Diode Resistance, Static and Dynamic Resistance, Comparison of practical with ideal diode, load line analysis of a diode circuit.

**Unit 3:- Rectifying Circuits and DC Power supplies:** p-n junctions as an rectifier, form factor, average voltage and current, haft wave & full wave rectifier, voltage regulation, Ripple factor, Bridge rectifier, Comparison of rectifier circuits, Filter circuits for power supplies, inductor filter, capacitor filter, Effect of capacitor series resistance, Peak inverse voltage of a half wave rectifier, LC filter, Comparison of filter circuits.

**Unit 4:- Diode Applications:** Clippers, Series and parallel, Clampers, Zener diodes, Zener diode specification, Voltage regulator circuits, Design of a voltage regulator circuits, Effect of supply voltage variations, Zener diode breakdown mechanism, Voltage multiplier circuits, voltage doublers, voltage Tripler, Quadrupoler.

**Unit 5:- Bipolar Junction Transistor:** The junction transistor, Transistor current components, transistor as an amplifier, Common base configuration. Early effect, the input and output characteristics, Common emitter configuration I/O characteristics, Active, Saturation, Cut-off regions for both configurations, common collector configuration, common base current gain, common emitter current gain.

**REFERENCES**

1. Integrated Electronics: Analog and Digital Circuits and System by Millman, halkias and Parikh, TMH, Second Edition.

2. Electronic Devices and Circuits, An introduction by Allen Mottershead,TMH.

Electronic Devices and Circuits theory by Robert L. Boylestad, Lonis nashelsky,

# B.Tech. Second Semester

## Paper: Mathematics-II

## Paper Code: MA-102

Note: A setting of eight questions will be there covering all the units proportionally out of which any five are to be attempted.

UNIT:1 **Numerical Techniques:** Numerical solution of algebraic and transcendental equations by Bisection method, Secant method, Regula-Falsi and Newton-Raphson methods. Numerical integration by Gauss quadrature formula, Trapezoidal rule, Simpson's rule and Weddle's rule. Numerical solution of ordinary differential equations by Euler's method, Milne's method and Runge-Kutta method.

UNIT:2 **Probability and statistics:** Definitions of probability and simple theorems, conditional probability, Baye's Theorem, random variables, discrete and continuous distributions, Binomial, Poisson and normal distributions, correlation and linear regression.

UNIT:3 **Complex Analysis:** Analytic functions, C-R equations in Cartesian and polar forms, Harmonic functions, Milne-Thomson method, complex integration, Cauchy's theorem, Cauchy's integral formula. Lioville's and Morera's Theorems, Taylor's and Laurent's theorems. Residues: Cauchy's residue theorem, evaluation of real integrals of the type $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, do$ and $\int_{-\infty}^{\infty} fen, dx$.

References


1. E.Balagurusamy: Numerical Methods, Tata McGraw Hill, 2008.
2. Devi Prasad: An introduction to Numerical analysis, Narosa Publishing House, 2006.
3. J.B.Conway: Functions of one complex variable, springer verlag, International Students Edition Narosa Publishing House, 1980.
4. A.M.Goon, M.K.Gupta & B.Das Gupta: Basic Statistics, The world Pren Pvt. Ltd., Calculta, 1991.
5. L.V.Alhfors: Complex analysis, Tata McGraw Hill, 1979.

**EE-101** **Basic Electrical Engineering** **Credits 4 (3-1-0)**

**UNIT 1: Basic Concept:** Definitions & units, Introduction to Basic Laws, Circit Elements, KVL, KCL, Ideal & Real Sources, Dependent & Independent Sources, Conversion of Voltage Source into Current Source & vice Versa, Controlled and Uncontrolled Sources, Loop and Nodal Method of analysis, Star to Delta Transformation & vice-versa.

**UNIT 2: Magnetic Circuit:** MMF, Flux, Reluctance, Magnetic Effect of Electrical Current, Hysterisis & Eddy Current Losses.

**UNIT 3: Network Theorems:** Superposition, Thevenin, Norton, Maximum Power Transfer & Reciprocity Theorems.

**UNIT 4: Steady-State Response:** Steady-State Response of Circuit to Sinusoidal functions, Phasor Representation of Sinusoids, Concept of Complex Impedance, Series & Parallel AC Circuits, Series & Parallel resonance

**UNIT 5: Balanced Three-Phase Circuit:** Generation of Three Phase Voltage, Star/Delta Connected Supply, Balanced Load Circuits, Line and Phase Voltage & current Relations. Concept of Three Phase Power.

**UNIT 6: Transient:** Response of RC, RL & RLC Circuit to DC Excitation only (simple problem).

**UNIT 7: Instruments:** Introduction to MI,MC Instruments, Extension of range, Dynamometer Type Wattmeter, Simple problems based on these instruments.

**Books:**

**1)** Basic Circuit Therory by L.P.Huelsman, PHI.
**2)** Hughes Electrical Technology by M.Smith, Addison-Wessley Pub
**3)** Electrical Technology by B.L.Theraja.
**4)** Electrical Engineering Fundamentals by V.Deltoro, PHI

## B.Tech. FIRST YEAR (SECOND SEMESTER)

**PH-102 Physics-II Credits-4 LPT(310)**

**Dielectric Properties of Materials:** Polarization of dielectrics, dielectric constant, electric susceptibility, non-uniform polarization, electric displacement vector, Lorentz local field, Polarizability, Clausius-Mosotti relation, frequency dependence of dielectric constant.

**Magnetic Properties of Materials :** Magnetization, three magnetic vectors (B.M & H), susceptibility and permeability, Dia, Para, and ferromagnetism, Magnetic domains, hysteresis, Ferro electricity & Piezoelectricity.

**Maxwell's Equations:** Displacement Current, Maxwell's equation in vacuum & medium (Integral and Differential forms), Poynting theorem, Poynting vector.

**Electromagnetic Waves:** Wave equation, plane waves, Propagation of electromagnetic waves through non-conducting medium, reflection and transmission.

**Superconductivity:** Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Type I and Type II superconductors, BCS theory (Qualitative), high temperature superconductors. Characteristics of superconductors in superconducting state, applications of superconductors.

**Nuclear Physics:** Basic properties and constituents of nucleus, mass defect, packing fraction and binding energy, semi empirical mass formula, elementary idea of nuclear forces and their characteristic properties, Nuclear fission, important components and working of nuclear fission reactor, Basic Concept of nuclear fusion reactors.

**Books:**


**1)** Electricity and Magnetism: Berkley Physics Course-II.
**2)** Electromagnetic waves & Radiating systems: Jordan and Keith.
**3)** Solid State Physics: C.Kittel
**4)** Nuclear Physics: I. Kaplan
**5)** Modern Physics: A.Beiser
**6)** Electrodynamics: d.Griffith.


**Environmental Studies: Scientific and Engineering Aspects**

**ME-102 L P T(3 0 0)**

Multidisciplinary nature of environmental studies, Ecosystems, Biodiversity and its conservation, Indicators of environmental pollution, Environment and human health. Consumption of natural resources and environmental degradation of forests, water, coal, minerals, energy, and land. Sustainable development, Environmental policy and legislation, Environmental impact assessment. Pollution of lakes, rivers, ground water, coasts, and oceans, Science and technology for drinking water and wastewater treatment and issues in management of systems. Solid and hazardous waste management: causes, effects and control measures. Air and noise pollution, science and engineering of pollution control, Global Issues including climate change, global warming, acid rain, ozone layer depletion, nuclear hazards, Disaster management, industrial accidents, floods, earthquakes, cyclones and landslides, Grees house effect etc.

**Suggested Books**

1. W.P. Cunningham and M.A. Cunningham, **Principles of Environmental Science,** Tata McGraw-Hill Publishing Company, New Delhi, 2002.

2. J.A. Nathanson, **Basic Environmental Technology**, Prentice Hall of India, New Delhi, 2002.

3. S.J. Arceivala, and S.R. Asolekar, **Wastewater Treatment for Pollution Control and Reuse** (3rd Edition), Tata McGraw Publishing Co. Ltd., New Delhi, 2006.

4. S.R. Asolekar, and R. Gopichandran, **Preventive Environmental Management: An Indian Perspective**, Foundation Books Pvt. Ltd., New Delhi, 2005. Some selected book-chapters, monographs and journal papers

**Fundamentals of Economics**

**HU-102** **LPT(300)**

**Microeconomics:** What is Economics?basic economic problems and nature of economics; demand and supply; consumer choice; individual and market demand; production and cost of production; profit maximization and perfect competition; market structure-monopoly, monopsony, monopolistic competition, and oligopoly; externalities and public goods; factor markets-land, labour and capital market.

**Macroeconomics:** National income accounting-income, expenditure and components of GDP; consumption and saving; investment spending and demand for money; financial systems-central bank, money, credit, financial markets and asset prices; income and spending; money, interest and income; fiscal and monetary policies; economic growth and accumulation; aggregate supply-wages, prices and unemployment; inflation.

Suggested Books


1. R.S. Pindyck and D.L. Rubinfeld. **Microeconomics** (7th Edition), Pearson Prentice Hall, New Jersey, 2009.
2. 2. R. Dornbusch, S. Fischer, and R. Startz. **Macroeconomics** (9th Edition), McGraw-Hill Inc. New York, 2004.

**Basic Mechanical Engineering ME-104**

| **Credit: 04** | **L** | **T** | **P** |
|---|---|---|---|
| | **3** | **1** | **0** |

**A. Thermodynamics:**

**Unit: 1** **Fundamental Concepts and definitions:** Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view. Density, specific volume, pressure, temperature. Thermodynamic equilibrium, property, state, path, process, cyclic process, Energy and its form, work and heat, Enthalpy.

**Unit: 2** **Zeroth Law:** Concepts of temperature, zeroth law.
**First Law:** First law of thermodynamics. Concept of processes, flow processes and control volume, flow work, steady flow energy equation, Mechanical work in a steady flow of process.
**Second Law:** Essence of second law, Thermal reservoir, Heat engines. COP of heat pump and refrigerator, Statements of second law. Carnot cycle, Clausius inequality, Concept of Entropy.

**Unit: 3** **Properties of steam and thermodynamics cycles:** Properties of steam, use of property diagram, Steam-Tables, processes involving steam in closed and open systems. Rankine cycle.
Introduction to I.C. Engines-two & four stoke S.I. and C.I. engines. Otto cycle, Diesel cycle.

**B. Mechanics**

**Unit: 4** **Force system and Analysis:**
**Basic Concept:** Laws of motion. Transfer of force to parallel position. Resultant of planer force system. Free Body Diagrams, Equilibrium and its equation, Centre of gravity, Moment of Inertia.
**Friction:** Introduction, Laws of coulomb friction, Equilibrium of bodies involving dry friction-Belt Friction.

**Unit: 5** **Stress and Strain Analysis:**
**Simple stress and strain:** Introduction, Normal shear stresses, stress-strain diagrams for ductile and brittle materials, elastic constants, one dimensional loading of members of varying cross sections, strain Energy.

**Unit: 6** **Newton's Second Law:** D' alemberts Principle-problems (for horizontal & inclined surface). Analysis of lift, motion problem. Motion of several connection bodies, Motion of two bodies connected by as tiring, when one body is lying on horizontal surface and other is hanging free, when one body is lying on inclined plane and other is hanging free case (i) Smooth inclined surface case (ii) Rough inclined surface of co-efficient of friction 'μ' (only problems).
**Work Power & Energy:** work-Units of work-Problems (horizontal & inclined surface). Power Derivation of the expression for power required

to drive a body, problems energy, Types of energy problems. Laws of conservation of energy. Newton's law of conservation of momentum. Plastic impact & Elastic impact. Driving a pile into ground-problems. Motion of connected bodies, work done by spring.

**Books:**


**1)** Thermodynamics by P.K. Nag.
**2)** Thermodynamic by P.L. Ballaney.
**3)** Engineering Mechanics & Strength of Materials by R.K.Bansal (Chapter 6, 7 & 9) Lakshmi Publications, New Delhi.
**4)** Holman, J.P.: Thermodynamics, MC Graw Hill book Co. NY.
**5)** Yadav R.: Thermodynamics and Heat Engines. Vol I & II (SI Edition) Central Publishing House Allahabad.
**6)** Yadav R.: Steam & Gas Turbines.
**7)** Engineering Mechanics by S.S. Bhavikatti & K.G. Rajashekarappa (Chapter 9 & 10) New Age Publications, New Delhi
**8)** F.L. Singer: Strength of Materials.
**9)** Timoshenko: Strength of Materials.


***Subject: Analog Electronics*** ***Code: EI-201 T*** ***Credits:4***

***Branches: EC, EI, CSIT and EE*** ***Sem: III semester*** ***L P T: 3 1 0***

**Unit 1:- Transistor as an amplifier:** Transistor Biasing and thermal stabilization: The operating point, Biasing Circuits, fixed bias, bias stability, self bias or emitter bias, fixing of Q-point using graphically & analytical methods, stabilization against variation in $I_{CO}$, $V_{BE}$, $\beta$: Bias compensation Diode for $I_{CO}$, $V_{BE}$.

**Unit 2:- The Transistor at low frequencies:** Two port devices and the hybrid model. The h-paratmeter, determination of h-parameter from input and output characteristics. Analysis of a transistor amplifier circuit using h-parameters; the emitter follower (its modelling), miller's theorem and its dual, cascading transistor amplifier (up to 2 stages), simplified hybrid model, high input resistance transistor circuit e.g. Darlington, Emitter follower.

**Unit 3:- Field effect transistors:** General description on FET, JFET operations, and its characteristic, MOSFET, the FET small signal model, CS and CD amplifiers at high and low frequencies.

**Unit 4:- Feedback amplifiers:** Classification of amplifiers, feed back concepts, transfer gain with feedback, general characteristics of negative feedback amplifier, input and output resistances for voltage series, current series, current shunt, voltage shunt feedback, analysis of feedback amplifier (voltage series, current series, current shunt, voltage shunt feedback).

**Unit 1:- Power amplifier:** Class A large signal amplifier, second harmonic distortion, higher order harmonic generation, the transfer audio power amplifier, efficiency, class B, class C, class AB and push-pull amplifier.

**REFERENCES**


1. Integrated Electronics Analog and Digital circuits and systems, J. Millman, Halkias and Prikh, TMD.

2. Electronics Devices and Circuit Theory; Robert Boylestad & Nashlasky (PHI).

3. Electronics Devices and Circuit: Allen mottershed (TMH).


***Subject: Electronic Measurement & Instrumentation*** ***Code: EI-203 T*** ***Credits: 4***

***Branches: EC,EI*** ***Sem: III Sem*** ***L P T: 3 1 0***

**Unit 1:- Measurement & measurement system:** Methods of measurement, Direct & Indirect types of measurement systems, Mechanical, Electrical: Classification of Instruments, Null type, deflection type; Mode operation: Analog, Digital.

**Unit 2:- Characteristics of Instrumentation & measurement System:** Static & Dynamic characteristics, Noise, Linearity hysteresis, Threshold, Dead Time & Dead Zone, Loading Effect, Input & Output Impedance.

**Unit 3:- Errors in measurements**

**Unit 4:- Dynamic response of Instruments & measuring Systems:** Dynamic response, First order system, second order System

**Unit 5:- Bridges:** DC Bridge-Wheatstone Bridge, Kelvin Bridge, measurement of low & High Resistance; AC Bridge-General equation of bridge balance, General form of AC Bridge, Maxwell's Bridge. Hay's Bridge, Wein Bridge, Schering Bridge.

**Unit 6:- Potentiometers:** DC Basic Circuit, Laboratory type, Standardization of Potentiometers; AC: Drysdale polar potentiometers, Gall-Tinsley AC Potentiometer (Working & Construction both).

**Unit 7:- Analog Ammeter & Voltmeter**

**Unit 8:- Measurement of Power & Wattmeter:** Power in DC & AC Circuit, Electrodynamometer Wattmeter, Measurement of Power in 3 Phase circuit, 3 Phase Wattmeter, Measurement refractive power.

**Unit 9:- CRO:** Observation of waveform on CRO, Measurement of Large & frequency (Lissajious figure).

**REFERENCE BOOKS**


1. Electronic Measurement & Instrumentation Published, Dhanpat Rai & Sons, By:- A.K. Sawhney.


***Subject: Electronics Engineering Materials*** ***Code: EC-201T*** ***Credits: 4***

***Branches: EC, EI*** ***SEM: III Semester*** ***L P T: 3 1 0***

**Unit 1:- Atoms & aggregates of atoms:** Introduction, nomenclature pertaining to electronic states, the electron configuration of atoms, nature of the chemical bond & classification of solids.

**Unit 2:- Dielectric properties of insulators in static fields:** Polarization & dielectric constant, the atomic interpretation of the dielectric constant of non-atomic gases, qualitative analysis of the dielectric of non-atoms gases, qualitative & quantitative dielectric constant of poly atomic molecules, the internal fields in solids & liquids, the electric constant of solids, some properties of ferroelectric materials, spontaneous polarization piezoelectricity.

**Unit 3:- Behaviour of dielectrics in alternating field:** Frequency dependence of the electronic permeability, ionic polarization as a function of frequency, dielectric relaxation, dielectric losses.

**Unit 4:- Magnetic properties of materials:** Classification of magnetic materials, diamagnetism the origin of permanent magnetic dipoles in matters, paramagnetic spin systems, some properties of ferromagnetic materials, anti-ferromagnetic materials, ferri magnetic materials.

**Unit 5:- The conductivity of metals:** Relaxation time, collision time & mean free path, electron scattering & resistivity of metals, the heat developed in a current carrying conductor, the thermal conductivity of metals, superconductivity.

**Unit 6:- The mechanism of conduction in semiconductor:** Classifying materials as semiconductors, the chemical bond in Si & Ge and its consequences, the density of carriers in intrinsic semiconductors, the energy gap, conductivity, hall effect & carrier density.

**REFERENCES**

1. Electrical Engineering Materials, A.J. Dekker

| | | |
|---|---|---|
| ***Subject: Electromagnetic Theory*** | ***Code: EC-203T*** | ***Credits: 4*** |
| ***Branches: EC, EI*** | ***SEM: III Semester*** | ***L P T: 3 1 0*** |

**Unit 1:- Elements of Vector Calculus:** Co-ordinate system, differential volume, surface 7 line elements, gradient, divergence, curl and del-operator.

**Unit 2:- Review of static electric field:** Coulomb's Law, Electric field-intensity, electric flux and flux density, Gauss's Law, conservation properties of electrostatic field, electric potential, Energy and work in electric field, Current, current density and conductor capacitance & dielectric materials, polarization relative permittivity, multiple dielectric capacitors, energy stored in a capacitor.

**Unit 3:- Review of magnetic field:** Faraday's law, Lenz's law, bio-savart law, Ampere's law, Magnetic flux density, Vector magnetic potential, stokes theorem, magnetic force, Displacement current, self, internal and mutual inductance.

**Unit 4:- Maxwell's Laplace's and Poisson's Equation and Boundary condition:** Introduction and its applications.

**Unit 5:- Electromagnetic waves:** Introduction and solutions for partially-conducting perfect dielectric and good conductor mediums, skin depth, interface conditions ate normal incidence, oblique incidence and Snell's laws, perpendicular and parallel polarization, standing wave, power and the pointing vectors.

**Unit 6:- Transmission Lines:** Wave equation for ideal transmission line, characteristics impedence, propagation & reflection, VSWR, impedance, transformation, smith chart, parallel and co-axial transmission lines, Impedance Matching, single and double stub matching, impedance matching single and double slub matching, impedance measurement, Motion of charged particles in an Electric & Magnetic Field.

**REFERENCES**

1. Electromagnetic; john D. Kraus TMH
2. Schaum's outline series on Electromagnetic; Joseph A. Edinister ,Tata Mc Graw hill inc.
3. Engineering Electromagnetics; Haytt, Kemmerly.
4. Electromagnetic wave and radiating system; John, Balmin
5. Engineering Electromagnetics; William Haytt

***Subject: Network Analysis& Synthesis*** ***Code: EE-201 T***
***Credits: 4***

***Branches: EC, EI, EE*** ***SEM: III Semester*** ***L P T: 3 1 0***

**Unit 1:- Graph Theory and Network Equation:** Introduction, Graph of a Network, Tree, Co-tree; Incidence Matrix, Cut set and Tie-set matrices, Network Equilibrium Equations, Analysis of Network, Duality and Dual Network.

**Unit 2:- Fourier Series:** Trigonometric and Exponential forms of Non-Sinusoidal functions, Evaluation of Fourier coefficients, Waveform Symmetry, Effective value of a Non-Sinusoidal Wave, Fourier Transform.

**Unit 3:- Laplace Transform:** Laplace Transform and its applications, Laplace Transformation, basic theorems, Gating function, Laplace Transform of periodic functions, initial value and final value theorems, Solution of network problems.

**Unit 4:- Two Port Networks:** Open Circuit, Short Circuit parameters, Hybrid and inverse hybrid parameters and interrelation between them, interconnection of two port networks, input output and image impedances.

**Unit 5:- Network Function:** Network function, Poles and Zeros, necessary conditions for driving points and transfer functions, application of network analysis, Driving network functions, Time domain behaviour from pole zero plot.

**Unit 6:- Passive network synthesis:** Hurwitz polynomial, positive real functions, LC, RL, R two terminal synthesis.

**Unit 7:- Attenuators:** Lattice, T-type, π-type, Bridge-T, L-type, Ladder type, balanced type, insertion loss.

**Unit 8:- Filters:** Filter fundamentals, Constant-k low pairs, Constant-k high pass and constant-k band pass. Band elimination filters m-derived T-section, termination with m-derived half sections, m-derived band pass.

**BOOKS**

1. Network Analysis by D. Roy Chaudhary, New stage publication.

2. Network Analysis by Van Valkenberg, PHI.

***Subject: Engineering Mathematics-III*** ***Code: MA-201 T*** ***Credits: 4***

***Branches: EC, EI EE and CSIT*** ***SEM: III Semester*** ***L P T: 3 1 0***

Note: A setting of eight questions will be there covering all the units proportionally out of which any five are to be attempted.

UNIT:1 **Ordinary Differential Equations:** First order equations (linear and non-linear). Linear equations of second and higher orders with constant and variable coefficients. Solution of second order equations by removing first derivative, changing of dependent and independent variables and method of variation of parameters.

UNIT:2 **Special Functions & Partial Diff. Eqns:** Power Series solutions of second order equations by frobenious method. Legendre polynomials and Berel's functions of first kind and their properties method of separation of variable for heat, wave and Laplace equations: Their solutions and related application.

UNIT:3 **Integral Transforms:** Laplace transform, existence theorem, Laplace transform of derivatives and integrals, Laplace transform of special functions. Inverse Laplace transform, convolution theorem. Applications of Laplace transform and its inverse to solve ordinary and partial differential equation.
Introduction to Fourier transforms. Fourier series, half range sine and cosine series, related applications.

References

1. J.N.Sharma: Differential Equations, Krishna Prakashan Media (P) Ltd., Meerut.
2. B.V.Raman: higher Engineering Mathematics, Tata McGraw Hill Co., Ltd., 2008.
3. R.K.Jain & S.R.K. Iyenger: Advance Engineering Mathematics, Narosa Publishing House, 2002.
4. A.R.Vashistha: Integral Transforms Krishan Prakashan Media (P) Ltd., Meerut.
5. G.G.Simmons: Differential Equations, Tata McGraw Hill Co. Ltd., 1981.

***Subject: Linear Integrated Circuits*** ***Code: EI-202 T*** ***Credits: 4***

***Branches: EC, EI, and EE*** ***SEM: IV Semester*** ***L P T: 3 1 0***

**Unit 1:- Differential Amplifiers:** Introduction, Differential amplifier circuit configuration, D.C. and A.C. analysis fo dual-input balanced output, single input-balanced output, dual input unbalanced output, single input-on balanced output, differential amplifier configuration, FET differential Amplifier, an introduction, differential amplifier with swamping resistors, cascaded differential amplifier stages, cascade or CE-CB configuration.

**Unit 2:- Operational Amplifiers:** Introduction, Block diagram representation of typical Op-Amplifier, level transistor stage of op-amp, transistor current mirrors and active loads, output stage of op-amp, transfer characteristic of output stage, constant current bias, Thermal stability.

**Unit 3:- Interpretation of data sheets and characteristics of an op-amp:** Interpreting a typical set of data sheets, electrical parameters like, input offset voltage, input offset current, input bias current, CMMR, Slew rate etc. The ideal op-amp, equivalent circuit of an op-amp, ideal voltage transfer curve, open loop op-amp. Configuration.

**Unit 4:- An Op-Amp. With negative feedback:** Block diagram representation o feedback configuration, voltage series and voltage shunt feedback amplifier, concentrating on voltage gain, input & output resistances, bandwidth with feedback expressions, voltage follower circuits.

**Unit 5:- Frequency response of an op-Amp.:** Frequency response, compensating networks, high frequency op-amp., equivalent circuit, open loop voltage gain as a function of frequency.

**Unit 6:- Applications of Op-Amp. & Linear I.C.'s:** Summing amplifier, scaling and averaging amplifier, instrumentation amplifier integrator, differentiator, differential amp. Realization using one and two op-amp.

(i) Active filters; Advantages of active filters over passive filters, First order low pass Butterworth filter design, Second order L.P. Butterworth filter, first and second order H.P. Butterworth filters. Higher order filtered an introduction; band pass and band reject filters. All pass filter design, introduction to oscillators.

**Unit 5:- 555 timer, 566 (VCO), P.L.L., - I.C.'s**

**REFERENCES**


1. Op-amps & linear integrated ckts by: - R.A. Gayakwad-PHI (India).
2. Operational amplifiers and linear integrated Ckts by Coughlin, Driscoll-PHI (India).
3. Linear integrated ckts by D. Roy Chaudhary, Shail Jain/New age international (P) Ltd, India.


***Subject: Signals and Systems*** ***Code: EC-202 T*** ***Credits: 4***

***Branches: EC, EI*** ***SEM: IV Semester*** ***L P T: 3 1 0***

**Unit 1:-** Fourier analysis of signals, Amplitude, Phase and Power spectrum, Orthogonality of functions, Types of signals, Fourier transform of some useful functions, Singularity functions & its properties, Dirac Delta function & its properties, Sampling function, Laplace transform of some useful functions.

**Unit 2:-** Convolution of signals, Graphical & analytical methods of convolution, sampling theorem, Nyquist rate & Nyquist interval, Aliasing, Aperture effect, Recovery from sampled signal, natural sampling, flat top sampling. Time convolution theorem, Frequency convolution theorem.

**Unit 3:-** Power & Energy signals, Energy & Power spectral densities of signals, Cross correlation, Auto correlation.

**Unit 4:-** Systems & Filters: Linear system, Time invariant & LTI system, Impulse response, Causal systems, Filter characteristics of linear systems, Low pass filter High pass filters, Band pass filters, Band pass, Band stop filters.

**Unit 5:-** Random variables and probability theory, PDF, CDF and their properties, Normal and Gaussian distribution.

**REFERENCES BOOKS**


1. Modern Digital & Analog System by B.P. lathi
2. Communication systems by Singh & Spare
3. Communication systems by Simon Haykins
4. Digital communication systems by Taub & Schilling
5. Probability theory and Queuing methods


***Subject: Digital Electronics*** ***Code: EC-204 T*** ***Credits: 4***

***Branches: EC, EI EE and CSIT*** ***SEM: IV Semester*** ***L P T: 3 1 0***

**Unit 1:- Basic concept of Boolean algebra:** Different rules for arithmetic operation, minimisation of switching functions with theorem and K-Map up to five variables, reduction techniques, prime and essential implicants, concepts of don't care condition, min. and max. Terms SOP, POS variables, entered mapping VEM, plotting & reading theory, QM methods.

**Unit 2:- digital logic families:** TTL, RTL, DTL, ECL, Totem pole and open collector concept, comparison of logic families.

**Unit 3:- Combinational Logic:** Design of combinational logic circuit using different chips/gates. Code converter: BCD-gray, excess three, encoders, decoders, multiplexers, de-multiplexers, 7-segment decoder/driver, ROM, PLA, full and half adder/subtractor, parallel adder/subtractor, look ahead carry generator, parity bit checker/generator, implementation of Boolean function with mux and decoder.

**Unit 4:- Sequential logic circuit:** Concept of memory storage, Latches, Flip Flops, JK, SR, T, D, Master slave, characteristic table truth table, concept of flip flop, conversion techniques, race around condition, Triggering of flip flop, classification of sequential machines, oscillators, analysis of synchronous sequential circuits, design steps for sequential circuits, state diagram, state reduction minimization of the next state decoder, o/p decoder designing.

**Unit 5:- Design of single mode and multimode counter:** Ripple & ring, Registers, Shift register, Shift register sequences, Ring counter using shift register and memories type of register universal and directional.

**REFERENCES**


1. Digital logic and computer design by MORRIS MANO (PHI)
2. Digital principles and applications by MALVING & LEACH, McGraw-Hill Book Co.
3. Fundamental of digital electronics by BARITTEE, TMH


| | | |
|---|---|---|
| ***Subject: Industrial Management*** | ***Code: ME-212T*** | ***Credits 04*** |
| ***Branches: EC, EI, EE, and CSIT*** | ***Semester: IV Sem*** | ***LPT: 3 1 0*** |

1. Work study, method study & work measurement including time study, work sampling, production study, PMTS, MTM, importance of time standards, rating & allowance. Work study, incentive schemes, job description, analysis & evaluation.

2. Plant maintenance, preventive maintenance, maintenance strategy, value engineering. Ergonomics, safety health & environmental protection, work physiology job stress & fatigue, ergonomics of manual material handling.
3. Market research, principle of marketing, customers viewpoint & selective selling, functions & scope of marketing, sales forecasting techniques.
4. Performance measures of a Production system, Production, Productivity, Efficiency, Effectiveness, Quality, Flexibility, Agility etc.
5. Organization, organization structure, department on functional charts for business & industrial organization centralized & decentralized organizations, manpower planning, requirement & forecasting, recruitment training & placement.
6. Role of IT in Systems - MIS, FMS, Japanese intherenes; JIT, Kanban, Decision, Support Systems.

Text Book:

1. Engineering Management by: Fraidoon Mazda

Reference:

2. Marketing Management by: Philip Kotler

***Subject: Computer Organization*** ***Code: CS-204 T*** ***Credits: 4***

***Branches: EC, EI , CSIT*** ***SEM: IV Semester*** ***L P T: 3 1 0***

**1.Introduction: -** Review of digital logic gates, Design of adder and subtractor using gates & K-MAP, functioning of multiplexer, de-multiplexer, flip-flop.

**2.Arithmetic for Computer:-** Introduction to number system, negative numbers, addition & subtraction, logical operation, constructing and A.L.U., multiplications & division, floating point arithmetic.

**3.Processor Design:-** Processor organisation, Processor Level, information representation, instruction format, Addressing modes (Implied Mode, Immediate mode, register indirect mode, auto increment or Auto decrement mode, direct addressing mode, indirect addressing mode, relative addressing mode, index addressing mode), instruction types.

**4. Control Design: -** Control memory address sequencing, micro instruction interpretation, CPU control unit, basic concepts of micro programmed control, micro program sequencer for a control memory, micro instruction formats.

**5.Memory Organization:-** Classification memories, Memory Hierarchy, Optimization of memory hierarchy, Virtual Memory, Dynamic Address Translation Scheme addressing scheme for main memory, segmented memory system, paged segment memory, memory management policies, High speed memories, characteristics of cache memory, Cache memory organisation, Block replacement policies, interleaved memories, associated memories.

**6. System Organization: -** Bus arbitration, Programmed I/O (IO addressing, IO instruction), DMA (Types & procedures), interrupts (procedure, interrupt selection, vectored interrupts), Concurrency Control, System management.

**REFERENCES**


1. Computer Architecture and Organization, By John P. Hayes, Me Graw Hill.
2. Computer organization and design, by John L. Hennessy 7 David A. Petterson, Morgan Kaufman.
3. Computer System Architecture, by M. Morris Mano, PHI


B-TECH. SEMESTER-IV

## ELEMENTS OF ELECTRICAL MACHINES

EE-202T

| L | T | P | TOTAL |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

***UNIT-I:***

**TRANSFORMER:**

Principle & construction of single phase transformer, EMF equation, phasor diagram, equivalent circuit diagram ,SC test, OC test, efficiency.

***UNIT-II:***

**DC MACHINES**:

Principle & construction of DC generator, types of windings, types of DC generator, OCC, load characteristics, principle & construction of DC motor, back EMF, torque equation, load characteristics.

***UNIT-III:***

**INDUCTION MOTORS**:

Principle and construction of 3-phase induction motor, concept of slip, phasor diagram. Equivalent circuit diagram, T-S characteristics.

***UNIT-IV:***

**SYNCHRONOUS MACHINES:**

Principle and construction of synchronous machines, EMF equation, OCC & SCC, synchronous impedence, principle of synchronous motor, V-curve, synchronous condenser.

**Text Books:**

Electrical Technology by B.L.Theraja

P.S.Bimbhra, "Electrical Machinery", Khanna Publisher

| | | |
|---|---|---|
| ***Subject: Linear Integrated Circuit Lab*** | ***Code: EI-202P*** | ***Credits: 2*** |
| ***Branches: EC, EI and EE*** | ***SEM: IV Semester*** | ***L P T: 0 0 3*** |

***List of Experiments***

1. To perform inverting, non-inverting amplifier and voltage follower using 741 IC.
2. To perform integrator and differentiator using 741.
3. To determine parameters of 741 IC a) input bias current, b) input off-set current, c) input off-set voltage d) slew rate.
4. To perform the comparator circuit using 741 IC.

5. To perform the square wave generator circuits using 741 IC.
6. To perform the Wein Bridge Oscillator circuit using 741 IC.

***Other Subjects***

1. MA-202 Mathematics III.
2. EE-202 Electrical Machines.

***Other Laboratories***

1. EC-202P Digital Electronics Lab (EC, EI, CS, EE)
2. EE-202 Electrical Machines Lab

***Subject: Analog Communication System*** ***Code: EC-301T*** ***Credits: 4***

***Branches: EC, EI*** ***SEM: V Semester*** ***L P T: 3 1 0***

**Unit 1:- Modulation Process:** Definition of amplitude modulation, frequency modulation & phase modulation, DSB-AM, DSB-SC-AM, using linear modulation and non linear modulation.

**Unit 2:- Linear Modulation:** Collector modulator or plate modulator and base modulator.

**Unit 3:- Non linear modulation:** Balanced moduling & ring modulator

**Unit 4:- Generation of frequency modulation:** Indirect method of FM i.e. Armstrong method of frequency modulation direct method of FM: reactance modulator.

**Unit 5:- Demodulation/detection process:** Demodulation of AM waves, diode detection 1, average detection and 2. Envelop detection, superhetrodyne receiver.

**Unit 6:- Demodulation of FM or frequency discriminators:** Single tuned discriminators, double tuned discriminators, foster seely discriminators, ratio detectors, and phase locked loop (PLL) demodulator.

**Unit 7:- Noise:** SNR (signal to noise ratio), noise figure, noise temperature of a cascaded system, S/N in DSB-SC receiver, S/Nin SSB-SC receiver, S/N in FM receiver, pre-emphasis and de-emphasis.

**Reference Books**


1. Communication systems - B.P. Lathi
2. Communication system - Simon Haykin
3. Principles of communication - George Kennedy
4. Communication system - R.P. Singh & S.D. Spare
5. Principles of communication system - Taub Shilling

**Subject: Antenna & Wave propagation** **Code: EC-303T** **Credits: 4**
**Branch: EC** **Sem: V** **LPT:310**

**Unit-1: Introduction**

Antenna fundamental and definition, Maxwell equation, Electromagnetic spectrum, Radio frequency band.

**Unit-2: Theory of Radio wave radiation and reception**

Current across closed surface, Boundary condition in electromagnetic field, Electromagnetic wave equation in dielectrics and conductors, Radiation from elementary source, Radiation of dipole of finite length, The influence of the earth and metal bodies on antenna radiation.

**Unit-3: Fundamental of Antenna**

Basic antenna parameter, patterns, beam area, radiation intensity, beam efficiency, directivity, antenna aperature, effective height**,** field from oscillating dipole, antennas field zones, polarization.

**Unit-3: Types of Antenna devices**

Thin linear Antenna, cylindrical antenna, Biconical antenna, Loop antenna, Helical antenna, slot and micro strip antenna, Horn antenna, Reflector antenna, Lens antenna, Wide band antenna, Terahertz antenna, frequency independent antenna, smart antenna, plasma antenna ,embedded antenna

**Unit-4: Antenna Measurement**

Introduction, Basic concept, Typical sources of errors in antenna measurements, Measurements of different antenna parameters (Input and mutual impedance, Radiation pattern, Gain, Phase front, Polarization).

**Unit-5: Radio Wave Propagation**

Propagation characteristics of electromagnetic wave, Ground or surface wave propagation, sky wave propagation, space wave propagation, Tropospheric scatter propagation

**Text books:**


1. Antenna: Fusco (Pearson Education)
2. Antenna: J.D. Kraus (TMH)
3. Antenna: D-Pozar (PHI)

**Subject: Consumer Electronics** **Code: EC-315T** **Credits: 4**
**Branch: EC, EI** **Sem: V** **LPT:310**

**Unit-1: Audio System**
Microphones, Tape recorder, Audio compact disc system, High fidelity Audio system, Stereo sound system, loudspeaker, public address system, magnetic sound recording.

**Unit-2: Television**
Introduction, Radio and TV Transmission & Reception, Block diagram of TV transmitter, Television studies and Equipment, Antenna for TV transmitter, Block diagram of TV receiver, TV camera tube, Persistence of vision, scanning, Synchronization, CCTR-B System, Composite video signal, Bandwidth of TV signal, Audio signal modulation, TV channel, Television Rx antenna, Feeder cable, Balun T/F, Monochrome picture tube, Black & white TV Rx, Colour TV signal, Colour TV Rx, PAL signal, compatibility, CCTV, Cable TV, HDTV.

**Unit-3: Video Cassette Recorder**
VCR Principle of video recording on magnetic tapes, Block diagram of VCR, VHS, Tape transport mechanism, study of VCD & DVD.

**Unit-4: Miscellaneous Devices**
Digital watch, Calculators, An electronic guessing game, Cordless Telephone, Mobile telephone, Cellular telephone, Battery telephone, Battery Eliminator, Battery charger, DC supply, DC supply operational amplifier, IC regulator, UPS, Inverter, Decorative Lighting, Microwave oven, LCD tunes with alarm.

**Text books:**
1. Consumer Electronics: B.R. Gupta

***Subject: Microprocessor & their Applications Code: EI-301 T Credits: 4***

***Branches: EC, EI, EE, ME and CSIT SEM: V Semester L P T: 3 1 0***

**Unit 1:- General features of Microprocessor:** Microprocessor architecture and its operation, Memory, Memory Organisation, Memory Mapped I/O mapped I/O Scheme.

**Unit 2:- Architecture of 8085 Microprocessor:** 8085 Microprocessor pin configuration, Internal architecture and its operation, Control signals, Flag register, Timing control unit, Decoding, Execution of an instructions and memory interfacing. Timing instruction cycle, Opcode Fetch, memory and input output read/write cycle of an instruction set.

**Unit 3:- Programming Techniques of 8085 Microprocessor:** How to write and execute a simple program timing and execution of the instructions, Addressing modes, programming techniques, programming technique for looping, counting and indexing, counter programs and timing delay program and timing calculations, stack operation and subroutine programs.

**Unit 4:- Interrupts of 8085 Microprocessor:** Hardware and software interrupts, interrupts call locations, RIM, SIM, RST 7.5, 6.5 and 5.5.

**Unit 5:- Programmable interfaces of 8085 microprocessor:** Programmable peripheral interface 8255, programmable interval timer 8253/8254, DMA controller 8257, and interrupt controller 8259.

**Unit 6:- Microprocessor Applications:** Delay subroutine, seven segment display, water level indicator, microprocessor based traffic control.

**Unit 7:- Introduction of 8086 microprocessor:** Internal Architecture organisation, Maximum mode and minimum mode, instruction set, initialization instructions, constructing the machine codes for 8086 instruction. Assembler directives, addressing modes, procedure and macros, re-entrant and recursive procedures.

**Unit 8:-** 8087 Coprocessor, Features and internal organization, RS-232, RS-442, IEEE-488, Features and architecture of 80186, 80286, 80386 & 80486.

**REFERENCES BOOKS**


1. Microprocessor Architecture programming and application with 8085/8080 by Ramesh S. Gaonkar.
2. Fundamentals of Microprocessor & Microcontroller by B. Ram.
3. Microprocessor and interfacing Programming and Hardware by Douglas V. Hall.
4. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 80486, Pentium and Pentium pro-processor, Architecture, Programming and interfacing by Berry b. Bery.


***Subject: Control system Code: EE-301T Credits: 4***

***Branches: EI EC and EE SEM: V Semester L P T: 3 1 0***

**Unit 1:- Introduction:-** Basic components of a control system, open loop & closed loop systems.

**Unit 2:- Feedback Control System:-** Principle of feedback, Transfer function, block Diagram and its Reduction Techniques, Signal flow graph, Effect of feedback on parameters variations and disturbance signal.

**Unit 3:- Mathematical Modelling of physical System:-** Modelling of translation and rotation mechanical systems, electrical systems, transfer function of these systems.

**Unit 4:- Time Response Analysis:-** Time response of first & second order systems, steady-state errors, and error constant, Time domain specifications of second order systems. Basic concepts of P, PD, PI, PID controllers.

**Unit 5:- Stability:-** basic concepts, BIBO stability, asymptotic stability, Routh-Hurwitz Criterion.

**Unit 6:- Root Locus Techniques:-** Basic properties & construction of root loci.

**Unit 7:- Frequency domain specification:-** Frequency domain specification, Bode plots, Polar plots, Nyquist stability criterion, Gain & Phase Margins, M & N-circles, Nichols chart.

**Unit 8:- Compensator Design:-** Basic concepts of lag, lead & lag-lead compensators.

**BOOKS**


1. Control System Engineering by Nagrath & Gopal (New Age)
2. Modern Control Engineering by K. Ogata (PHI)
3. Automatic Control System by B.C. Kuo, PHI


***Subject: Power Electronics*** ***Code: EE-303T*** ***Credits: 4***

***Branches: EI, EC and EE*** ***SEM: V Semester*** ***L P T: 3 1 0***

**Unit 1:- Introduction:-** Solid State Power Devices, Construction & Characteristics of Power Diode, Fast recovery Diode, Transistor, MOSFET, IGBT, GTO, TRIAC and DIAC, Dynamic

characteristics of SCR, Gate Characteristics, Ratings, Mountings, Protection, Series & Parallel Connections, Snubber Circuit.

**Unit 2:- Firing Circuit & Commutation Techniques:-** R.R-C, UJT & Static Firing Circuits, Commutation Techniques-Line Commutation, Resonance Communication, External Pulse Commutation; Current & Voltage Commutation-Auxiliary & Complementary.

**Unit 3:- AC Regulator:-** Single Phase AC Regulator, Synchronous Tap Changer, Multistage Regulators, 3-Phase AC Regulator and speed control of AC Motors using ac regulator.

**Unit 4:- AC to DC Converters:-** Single Pulse, Mid-point & Bridge type two-pulse converters, Semi converter, 3-phase mid-point & Bridge converters, Single-phase & 3-phase Dual-converters-circulating & Non-Circulating Current Schemes, PWM Techniques, Speed Control of D.C. Motor using Converters.

**Unit 5:- DC Choppers:-** Step-down & Step-up Choppers, Single, Double 7 Four-Quadrant Choppers, Control Strategies, Voltage & Current Commutated Choppers, Multiphase Chopper, Speed Control of DC Motor using Chopper.

**Unit 6:- Inverters:-** Mid-point & Bridge type 1-inverter, 3-inverter-$120^0$ & $180^0$ conduction schemes, Modified McMurray inverter, McMurray Bedford inverter, Morgan inverter, Current Source inverter, CSI vs. PWM techniques, speed control of AC motors using inverters.

**Unit 7:- Cyclo-converters:-** 1-&3-Cyclo-converters, mid-point & bridge type cycle-converters, advantage of cyclo-converters.

**BOOKS**


1. Power Electronics Circuits, Devices 7 Application by M. Rashid, PHI
2. Power Electronics & Introduction to Drives by A.K. Gupta & L.P. Singh, Dhanpat Rai.
3. Power Electronics by P.S. Sen, TMH


***Subject: Digital signal processing*** ***Code: EC-302T*** ***Credits: 4***

***Branches: EI, EC*** ***SEM: VI Semester*** ***L P T: 3 1 0***

**Unit 1:- Discrete time Signals & Systems:-** Discrete-time signals, discrete time systems, analysis of discrete time linear system-invariant systems.

**Unit 2:- The Z-transform:-** The Z-transform, properties of Z-transform, Inversion of Z-transform, one sided Z-transform.

**Unit 3:- Discrete Fourier Transform:-** Its properties & applications; Discrete Fourier Transform, properties of Discrete Fourier Transform, linear filtering methods based on DFT.

**Unit 4:- Efficient computation of the DFT:-** Fast Fourier Transform, FFT algorithms, application of FFT algorithms.

**Unit 5:- Implementation of Discrete-time system:-** Structure of the realization of discrete-time systems, structures, of FIR systems, structures of HR systems.

**Unit 6:- Design of digital Filters:-** General considerations, design of FIR filter, design of HR filters from analog filters.

**REFERENCE BOOKS**


1. Digital signal processing (principles, algorithms and applications) by John G. Proakis & Dimitris G. Manolakis, PHI
2. Digital signal processing by Alan V. Oppenheim and Ronal W. Schafer.
3. Introduction to Digital System Processing by Roman Kook., McGraw hill international editions.


***Subject: Microcontrollers and Embedded Systems*** ***Code: EI-302 T*** ***Credits: 4***

***Branches: EC, EI,*** ***SEM: VI Semester*** ***L P T: 3 1 0***

**Unit 1:- Introduction of Microcontrollers:** Introduction, basis architecture, differences between microprocessors and microcontrollers, overview of the 8051 family, 8-bit and 16-bit microcontroller.

**Unit 2:- 8051 Microcontroller:** Architecture, pin description, input-output port and their functions, Memory organization, Timer/Counters, Serial port, Parallel ports.

**Unit 3:- Instruction Sets and Programming of 8051 Microcontrollers:** Instruction set, Address modes, Assemblers and Compilers, 8051 assembly language programming, 8051 timer programming, Basic

registers of the Timer and programming in different modes, 8051 Counters programming, basic registers of the counters and programming in different modes, serial port programming.

**Unit 4:- Real world interfacing of 8051 with:** LED, Seven segment display, LCD, push button and Relay, keyboard, ADC and DAC, Stepper motor, Bridge and DC motor.

**Unit 5:- Introduction to Advanced Microcontrollers:** Introduction and Architecture of PIC, ARM, AVR and AT 89C2051 Microcontroller.

**Unit 6:- Embedded Systems:** An introduction to embedded system, classification of embedded systems.

**Recommended Books**


1. The 8051 Microcontroller and Embedded System-M.A. Mazidi, Pearson Education.
2. Microcontrollers-A.J. Ayala, Penram International Publishing (1) Pvt. Ltd.
3. 8051 Microcontroller-I. Scott Mackenzie.
4. Microcomputer systems, The 8086/8088 family-Liu & Gibson, prentice Hall of India.
5. The 8086/8088 Family-Design, programming and interfacing-John Uffenbeck-Prentice Hall of India.
6. Microprocessor Architecture, programming and applications with 8085-R.K. Gaonkar, New Age International Publishers.


***Subject: Digital Communication System*** ***Code: EC-304T*** ***Credits: 4***

***Branches: EC, EI,*** ***SEM: VI Semester*** ***L P T: 3 1 0***

**Unit 1:-** Introduction to Digital Communication, Basic Building Blocks, Sampling Process, natural & flat Top samplings, Aperture effect, equalization, PAM, channel BW for PAM signals, signal recovery through holding.

**Unit 2:-** Quantization of signals, Quantization error, Companding, PCM, and PCM Building blocks, multiplexing PCM Signals, T1 Digital System, Line Coding, Bit rate, DPCM.

**Unit 3:-** Delta Modulation, Slope overloading, Adaptive delta Modulation, Digital Modulation Techniques, BPSK, ASK, ASK, DPSK, QLSK, Transmitter & Receiver Probability of error of Different Modulation Techniques, Expansion.

**Unit 4:-** Data Transmission, Different Signals, Integrator Response, Optimum filter and matched filter, transfer functions calculation, Probability of error calculation for matched filter, correlation reception of signals, Noise calculation in PCM & DM Systems.

**Unit 5:-** Information Theory, Absolute & conditional Joint entropy schemes rate of information mutual information, Noise free channel, channel with independent input & output channel capacity, Binary symmetric channel, BEC channel, reception of signals, Shannon Hartley Theorem, capacity of Gaussian channel, BW S/N trade off, coding techniques, coding efficiency, Binary, Shannon Fanon, Huffinan coding error control code, Block codes, Linear block code, hamming distance, error correcting code, cyclic code, convolution codes.

**REFERENCES**


1. Communication System, Taub Schilling Pub-Tata McGraw Hill.
2. Communication System, Kennedy Pub-Tata McGraw Hill
3. Communication System, Singh & Spare Pub-Tata McGraw Hill
4. Digital Communication; L.A. Glover Pub-PHI, New Delhi.
5. Electronics Communication; Dennis Reddy & John Cooten
6. Communication Systems by Simon Haykins.

**Subject: Microelectronics** **Code: EC-308T** **Credits: 4**
**Branch: EC** **Sem: VI** **LPT:310**

**UNIT-1:**
Introduction to monolithic silicon integrated circuits, Processing technology, Silicon processing, Crystal growth, Vapour phase epitaxy, Chemical vapour deposition, Molecular beam epitaxy.

**UNIT-2:**
Oxidation, Doping processes: Diffusion & Ion implantation, Isolation techniques: p-n junction isolation & dielectric isolation.

**UNIT-3:**
Metallization: Vacuum evapouration & Cathode sputtering, Etching Processes: Wet etching & Dry etching or Plazma etching, Reactive plazma etching apparatus.

**UNIT-4:**
Photolithography: Photo mask fabrication, Photo etching, Photo resist, Electron beam lithography: Resists, electron optics, printing techniques, X-ray lithography: X-ray resist, X-ray sources, Printing techniques, X-ray masks, Synchrotron radiation. Ion beam lithography, Comparison of various lithography's.

**UNIT-5:**
Fabrication process sequence for Bipolar, NMOS, CMOS.

**Text books:**

1. V.L.S.I. Technique: S.M.S.-Publisher McGraw Hill.
2. V.L.S.I. Design Analog & Digital Technique: Geiger (Publisher McGraw Hill)

**SUBJECT: Radar And Navigational Aids** **Code: EC-306T** **Credit:4**
**Branch: EC** **Sem: lV** **LPT:310**

**Unit 1:- Introduction:** Basic Concepts, transmission mode, categories of network.

The OSI model, functions of the layers, interface services, Connections and connectionless oriented services, Services primitives.

**Unit 2:- The physical layer:** Transmission media, switching, Circuit switching & Packer switching, Message switching.

**Unit 3:- Date link layer:** Data Link Control:- Line Discipline, Flow Control, Error Control.

Data Link Protocol:- A Synchronous Protocol & Synchronous Protocols.

**Unit 4:- Medium Sub Access sub layers:** The channel allocation problem, Topologies: asymmetric and symmetric, Multiple Access protocol, IEEE Standard 802 for LAN & MANS. (IEEE 802.3 (Ethernet)), IEEE 802.4 (Token ring), IEEE 802.5 (Token Bus), IEEE 802.6 (DQDB).

**Unit 5:- Network layer:** Network layer: design issue, Routing, Algorithms (types and characteristics), Shortest path routing, Flooding, Distance vector routing, Link State routing. Congestion control algorithms; General principles of congestion control, congestion prevention policies, traffic shaping.

**Unit 6:- Introduction to Routers:** Bridges, ATM, ISDN, SNMP, HTTP, FTF, TELNET, POP3, SLIP, Network Simulator (NS-2).

**REFERENCES BOOKS**


1. Data Communication and network by Stalling, PHI.
2. Computer networks by A.S. Tannebaum, PHI.
3. Data Network by Bertisekar D, Gallegar R. PHI.
4. Data communication and networking by Behrouz A Forouzan, TMH


***Subject: Microcontrollers Lab*** ***Code: EI-302P*** ***Credits: 2***

Programming Practices on 8051 etc microcontroller universal kits and

1. Interfacing with LED
2. Interfacing with Seven Segment Display
3. Interfacing with LCD
4. Interfacing with Push Button and Relay
5. Interfacing with keyboard
6. Interfacing with ADC and DAC
7. Interfacing with Stepper Motor
8. Interfacing with H-Bridge
9. Interfacing with CD Motor
10. Design of small embedded system projects

**VLSI Design & Circuits** **EC-403 T** **SEM:VII**

**Credits 4 (Pool Elective)**

**UNIT:1** MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, basic Inverter device, Sizing Enhancement load verses load inverters, basic NMOS NOR logic circuit, basic NMOS NAND logic circuit, multi input NAND & NOR logic circuit.

**UNIT: 2** A basic C MOS inverter, CMOS inverter logic levels, inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate, NMOS pass transistor, CMOS, Transmission gate.

**UNIT :3** Ratio logic model, Process characteristics time const, inverter pair delay, super Buffer NMOS NAND & NOR DELAY, Enhancement v/s depletion load, CMOS logic delay, interconnection Characteristics capacitive loading logic fan out delay, distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, capacitive noise coupling, NMOS noise margin, CMOS noise margin.

**UNIT :4** Structured gate layout, logic gate arrays, Dynamic MOS storage circuit, simple shift register, other shift register, clock CMOS logic Evaluate, logic Domino CMS.

**UNIT :5** Semiconductor memory, memory organization, ROM design, EPORM, EEPROM, Static RAM, Storage cell, decode and selector circuit, select time delay calculation, optimum precharge voltage concept, dynamic RAM cell, sense amplifier, Stick rules & Diagrams.

**References:**


1. VLSI design & circuits by Geige: Publisher Mc-Graw Hill
2. VLSI design & circuit by Shoji.
3. VLSI design by Puknell.
4. Design technique for analog and digital circuits by L.Geizer, Philip E.allen, Noel R.starder.


**Open Elective (SYLLABUS)**

**Code: HU-449T Subject : Principle of Management Credits 4(3-1-0)**

**UNIT 1:** Management as a discipline: Definition, nature, scope, functions, managerial Skills, Management. Thought-Historical Prospective, Social Responsibility, of Business.

**UNIT2:** Planning: Concept and purpose, planning process, Management, By Objectives (MBO), Decision making.

**UNIT3:** Organization: Concept and purpose of organisation, types of organisation, bases of Departmentation, concept of Authority and Responsibility, Span of Management, Line and Staff Authority, Functional Authority, Delegation of Authority, Centralization and Decentralization of Authority, Coordination Staffing.

**UNIT4:** Directing: Leadership Concept, Ingredients, Traits, Styles, Roles Communication Concept. Types, Process Barriers, Making Communication effective, Importance.

**UNIT5:** Controlling: Concept, Provides, Requirements, for adequate control, controlling and earning, Budgeting control Importance, Management Audit, Management in future.

**MA-491T Mathematics (Operation Research) Credits 4(3-1-0)**

**UNIT 1: Introduction:** Definition of O.R. and it's scope, modelling in O.R. General methods for solving O.R. models. The Montocarlo technique, main characterstic of O.R. main phases of O.R. Linear programming problems. Graphical method for solve L.P.P., Two phase Method, Big-M Method, problems of tie.

**UNIT 2: Assignment Model :** Mathematical formulation of assignment model, Reduction theorem, problems of maximisation & minimisation. Hungarian process, travelling salesman problems.

**UNIT 3: Transportation Model :** Mathematical formulation of transportation problem. Definition of BFS, IBFS, Optimum solution. Algorthim of N-W rule, Least-cost & VAM and their problem

**UNIT 4: Sequencing :** Introduction, principle assumtions processing of jobs through two, three & m machine's.

**UNIT 5: Game Theory :** Characteristic of Games. Basic definitions, minimax criterion and optimal strategy. Equavalence of rectangular Games, Dominance process, Arithmatic method for solving zero-sum-two person Games. Graphical and simplex methods for solving the games.

**UNIT 6: Replacement:** Replacement of item that fail completely.

**UNIT 7: Inventory :** Elementry Inventory Models, Inventory models with price breaks.

List of Pool Elective:

1. EI-402 PCB Design & Technology
2. EI-456 Aircraft Instrumentation
3. EC-458 Digital Image Processing
4. EC-460 Microwave Integrated circuit

**PH 419T** **Futuristic Materials** **Credits 4(3-1-0)**

**Semiconductors :**

Introduction of semiconductors. intrinsic and extrinsic, II-VI and IIIV semiconductors and its alloys, Advantages and necessity of the tailoring of semiconductor, Semiconductors and it alloys used of LED and other devices, Utility of semiconducting alloys like GaAIAs, GaAIN, GaAIP etc.

**Superconductors:**

Fundamenal Phenomena associated with sumerconductors. Type I & II superconductors, Meissner Ochenfeld effects, Josephon effects, fundamental of BCS theory. Novel High Temperature Superconductors. Hole superconductors, TIBa CaCuO single and bilayer. Electron superconductors NdCuO etc. Doping effects in superconductors, Organic superconductors, fullerenesl. Application of the superconductors in science, medical and commercial sectors.

**Material for Magnetic media:**

Material useful for magnetic recording head, magnetic disk, magnetic tape media, Magneto optic recording materials. Holography, data storage materials.

**Holography:**

Fundamentals of holography, Difference between conventional photography and holography. Techniques to make a hologram. Advantages of holography over other techniques.

**Introduction of following with applications :**

Fibre optics, Lasers,Ceramics, Dielectric Chactrization of Materials

**Books:** **1)** Superconductivity Today: T.V. Ramakrishnan & C.N.R. Rao Wiley astern Pvt. Ltd, New Delhi, 1992

**2)** Solid State Physics: Ashcrost/Mervin

**List of Pool Elective:**

| | | |
|---|---|---|
| 1. | EC-435 | Optical Fiber communication |
| 2. | EC-452 | PC Interfacing |
| 3. | EC-403 | VLSI Design and circuit |
| 4. | EI-435 | Antenna Engineering |
| 5. | CS-402 | Multimedia |
| 6. | ME-473 | Work Study |
| 7. | EI-437 | Digital System Engineering |
| 8. | EI-439 | Virtual Instrumentation |

**Subject: Microelectronics Code: EC-308T Credits: 4 Branch: EC Sem: VI**

**UNIT-1:**
Introduction to monolithic silicon integrated circuits, Processing technology, Silicon processing, Crystal growth, Vapour phase epitaxy, Chemical vapour deposition, Molecular beam epitaxy.

**UNIT-2:**
Oxidation, Doping processes: Diffusion & Ion implantation, Isolation techniques: p-n junction isolation & dielectric isolation.

**UNIT-3:**
Metallization: Vacuum evapouration & Cathode sputtering, Etching Processes: Wet etching & Dry etching or Plazma etching, Reactive plazma etching apparatus.

**UNIT-4:**
Photolithography: Photo mask fabrication, Photo etching, Photo resist, Electron beam lithography: Resists, electron optics, printing techniques, X-ray lithography: X-ray resist, X-ray sources, Printing techniques, X-ray masks, Synchrotron radiation. Ion beam lithography, Comparison of various lithography's.

**UNIT-5:**
Fabrication process sequence for Bipolar, NMOS, CMOS.

**Text books:**

1. V.L.S.I. Technique: S.M.S.-Publisher McGraw Hill.
2. V.L.S.I. Design Analog & Digital Technique: Geiger (Publisher McGraw Hill)
3. Integrated Electronics: K.R.Botkar (Khanna Publisher)

**Subject: RADAR and Navigational Aids Code: EC-316T Credits: 4 Branch: EC Sem: VI**

**Unit-1: Introduction to RADAR**

Basic Radar –The simple form of the Radar Equation-Radar Block Diagram-Radar Frequencies – Applications of Radar – The Origins of Radar The Radar Equation Introduction-Detection of Signals in Noise-Receiver Noise and the Signal-to-Noise Ratio-Probability Density Functions-Probabilities of Detection and False Alarm-Integration of Radar Pulses-Radar Cross Section of Targets-Radar cross Section Fluctuations-Transmitter Power-Pulse Repetition Frequency-Antenna Parameters-System losses – Other Radar Equation Considerations.

**Unit-2 MTI and Pulse Doppler Radar**

Introduction to Doppler and MTI Radar-Delay –Line Cancelers-Staggered Pulse Repetition Frequencies –Doppler Filter Banks -Digital MTI Processing -Moving Target Detector Limitations to MTI Performance -MTI from a Moving Platform (AMIT) -Pulse Doppler Radar
– Other Doppler Radar Topics-Tracking with Radar –Monopulse Tracking –Conical Scan and Sequential Lobing -Limitations to Tracking Accuracy -Low-Angle Tracking -Tracking in Range - Other Tracking Radar Topics -Comparison of Trackers -Automatic Tracking with SurveillanceRadars(ADT).

**Unit-3: Detection of Signals in Noise**

Introduction – Matched –Filter Receiver –Detection Criteria – Detectors –-Automatic Detector - Integrators -Constant-False-Alarm Rate Receivers -The Radar operator -Signal Management - Propagation Radar Waves -Atmospheric Refraction -Standard propagation -Nonstandard Propagation -The Radar Antenna -Reflector Antennas -Electronically Steered Phased Array Antennas -Phase Shifters -Frequency-Scan Arrays Radar Transmitters-Introduction –Linear Beam Power Tubes -Solid State RF Power Sources -Magnetron -Crossed Field Amplifiers Other RF Power Sources -Other aspects of Radar Transmitter. Radar Receivers -The Radar Receiver -Receiver noise Figure - Superheterodyne Receiver -Duplexers and Receiver Protectors-Radar Displays.

**Unit-4: Introduction -Four methods of Navigation**

Radio Direction Finding -The Loop Antenna -Loop Input Circuits -An Aural Null Direction Finder - The Goniometer -Errors in Direction Finding -Adcock Direction Finders -Direction Finding at Very High Frequencies -Automatic Direction Finders -The Commutated Aerial Direction Finder -Range and Accuracy of Direction Finders Radio Ranges -The LF/MF Four course Radio Range -VHF Omni Directional Range(VOR) -VOR Receiving Equipment Range and Accuracy of VOR -Recent Developments. Hyperbolic Systems of Navigation (Loran and Decca) -Loran-A -Loran-A Equipment -Range and precision of Standard Loran -Loran-C -The Decca Navigation System -Decca Receivers - Range and Accuracy of Decca -The Omega

System.

**Unit-5:**

DME and TACAN -Distance Measuring Equipment -Operation of DME -TACAN -TACAN Equipment, Aids to Approach and Landing -Instrument Landing System -Ground Controlled Approach System -Microwave Landing System(MLS) Doppler Navigation -The Doppler Effect -Beam Configurations -Doppler Frequency Equations -Track Stabilization -Doppler Spectrum -Components of the Doppler Navigation System -Doppler range Equation -Accuracy of Doppler Navigation Systems. Inertial Navigation -Principles of Operation -Navigation Over the Earth -Components of an Inertial Navigation System -Earth Coordinate Mechanization -Strapped-Down Systems -Accuracy of Inertial Navigation Systems. Satellite Navigation System -The Transit System -Navstar Global Positioning System (GPS)

**Text books:**

1. Introduction to Radar Systems: Merrill I. Skolnik (TMH)
2. Navigation: Nagrajan

**Subject: Digital System Design Code: EC-433T Credits: 4 Branch: EC Sem: VII**

**UNIT-1: Digital Design Fundamentals & Design of Combinational Circuits:**
Hardware Aspects Related to ASSERTED and NOT-ASSERTED conditions, The Karnaugh Map, Five and Six Variable Maps, Prime and Essential Implicants, Variable-Entered Mapping, VEM Plotting Theory, VEM Reading theory, Tabulation Method.

**UNIT-2: Sequential Machine Fundamentals**
The Need for Sequential Circuits, Basic Architectural Distinctions between Combinational and Sequential Circuits, Concept of Memory, The Binary Cell, Fundamental Differences between Sequential Machines, The Flip-Flop, Flip-Flop Conversion from one type to another.

**UNIT-3: Traditional Approaches to Sequential Analysis and Design**
Introduction, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Steps for Traditional Synchronous Sequential Circuits, State Reduction, Counters, Shift Register, Shift Register Sequences.

**UNIT-4: Asynchronous Finite State Machines**
Why Asynchronous Circuits, Scope, Asynchronous Analysis, The Design of Asynchronous Machines.

**UNIT-5: Introduction to VHDL**
Introduction to Hardware Descriptive Languages, Types of Modeling and Fundamental to VHDL Programming

**Text books:**

1. An Engineering Approach to Digital Design: William I. Fletcher (PHI)
2. Digital Design: Morris Mano (PHI)

**Subject: VLSI Design & Circuits Code: EC-403T Credits: 4 Branch: EC Sem: VII**

**UNIT-1:**
MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, Basic inverter device, Sizing, Enhancement load verses load inverters, Basic NMOS NOR logic circuit, Basic NMOS NAND logic circuit, Multi input NAND & NOR logic circuit.

**UNIT-2:**
A basic CMOS inverter, CMOS inverter logic levels, Inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate, NMOS pass transistor, CMOS Transmission gate.

**UNIT-3:**
Ratio logic model, Process characteristics time constant, Inverter pair delay, Super buffer NMOS NAND and NOR delay, Enhancement v/s depletion load, CMOS logic delay, Interconnection characteristics, Capacitive loading, Logic fan out delay, Distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, Capacitive noise coupling, NMOS noise margin, CMOS noise margin.

**UNIT-4:**
Structured gate layout, Logic gate arrays, Dynamic MOS storage circuit, Simple shift register, other shift register, Clock CMOS logic, Evalute logic, Domino CMOS.

**UNIT-5:**
Semiconductor memory, Memory organization, ROM design, EPROM, EEPROM, Static RAM, Storage cell, Decode and selector circuit, Select time delay calculation, Optimum precharge voltage concept, Dynamic RAM cell, Sense amplifier, Stick rules & diagrams.

**Text books:**


1 VLSI Design & circuits: Geige (Publisher Mc. Graw Hill)
2 VLSI Design & circuits: Shoji
3 VLSI Design: Puknill
4 Design technique for Analog and Digital circuits: L.Geizer, Philip E.Allen & Noel R.Starder.

**Subject: Optical Fiber Communication Code: EC-436T Credits: 4 Branch: EC Sem.: VII**

**UNIT-1:-Introduction:**

Historical development, The general system, Advantage of optical fiber communication.

**UNIT-2:-Optical fiber waveguides**

Total internal reflection, Acceptance angle, Numerical aperture, Skew rays, Modes in planer guides, Phase and group velocity. Cylindrical fiber Modes, Mode coupling, Step index fibers, Graded index fibers.

**UNIT-3:-Transmission Characteristics of optical fibers**

Attenuation, Intrinsic absorption, Intrinsic & Extrinsic absorption, Linear & non-linear scattering, Rayleigh scattering, Mie scattering, Stimulated Brillouin scattering, Stimulated Raman scattering, Fiber bend loss, Mid infrared and far infrared transmission, Dispersion.

**UNIT-4:-Optical fibers and cables**

Preparation of optical fibers, Liquid phase (melting) techniques, Vapour phase deposition techniques, Fluoride glass fibers, Optical fiber, Optical fiber cable, Stability of the fiber transmission characteristics.

**UNIT-5:-Optical sources**

LASER, Basic concepts of LASER, Optical emission from semiconductors, Injection LASER characteristics, LED characteristics, Modulation.

**UNIT-6:-Optical detectors**

Device types, Optical detection principles, Quantum efficiency, Semiconductor photodiode, Midinfrared photo diodes, Photo transmitter, Photo conductive detectors.

**UNIT-7:-Optical fiber systems**

Basic system, Modulation formats, Demodulation schemes, Optical transmitter, Optical receiver, Optical power budgeting.

**UNIT-8:-Optical Fiber Measurements**

Fiber numerical aperture measurements, Reflection and optical return loss, Field measurement, Fiber attenuation measurements.

**UNIT-9:-Applications and future developments**

Military applications, Computer applications, Local area networks, Public network application, Medical applications.

**Text Book:**


1 Optical fiber communication: John M. Senior (PHI)
2 Optical fibers and fiber optic communication systems: Subir Kumar Sarkar (Publisher S.Chand & Company Ltd)
3 Optical fiber communication: Keiser (Publisher Mc. Graw Hill)
4 Optical communication systems: J. Franz, V.K. Jain (Publisher Narosa publishing house)

**Subject: Microwave Engineering Code: EC-405T Credits: 4 Branch: EC Sem: VII**

**Unit-1: Introduction to Microwave**

Microwave, Low frequency v/s Microwaves frequency, Microwave signal propagation, Advantages and application of microwave, Interaction b/w electron and fields.

**Unit-2: Transmission Media, Transmission line and Waveguides**

Transmission line propagation modes, Transmission line parameters, Scattering matrix, Smith chart, Waveguide (Rectangular and circular), Mathematical analysis of propagation modes and cut-off wavelength.

**Unit-3: Microwave Components**

Coupling probes and loops, Windows, Waveguide junctions, Directional couplers, Isolators and circulators, Waveguide flanges, Rotating joints, Attenuators, Phase shifters, Cavity Resonators, Wave meters, Hybrid ring, slotted line, Strip lines and micro strip lines ,quarter wave transformer, microwave filters

**Unit-4: Microwave Tubes**

Limitation of gridded tubes at high frequency, Klystron, Megnetron, CFA, TWT, BWO, Gyrotron, Peniotron, Comparison of microwave tubes.

**Unit-5: Semiconductor Microwave Devices & Integrated circuits**

Parametric amplifier, PIN diode, Tunnel diode, Gun diode, Impact diode, Trapatt diode, Barritt diode, Mitatt diode, MFET's, MMIC's.

**Unit-6: Microwave Measurements**

Network analysis, Microwave power measurements, Noise measurements, Spectrum analysis, and Frequency counter.

**Text books:**


1. Microwave Engineering: Lio
2. Microwave Engineering: R.E. Collin
3. Microwave Engineering: D-Pozar
4. Microwave Engineering: Annapurna Das Sisir K Das

**Subject: Antenna Engineering Code: EI-435T Credits: 4 Branch: EI Sem.: VII**

**UNIT-1:-Elements of Antenna Theory**

Antenna action, Antenna parameters; Gain, Power gain, Directive gain, Antenna resistance and its efficiency, Radiation from a short dipole, half wave dipole. Short monopole, Hertizen dipole, Pointing vector & power flow, Power & field pattern, Antenna aperture.

**UNIT-2:-Types of antennas**

Folded dipole, Loop & Bicanonical antenna, Rhombic antenna, Turnstile antenna, Helical antenna, Log periodic antenna and Parabolic reflectors.

**UNIT-3:-Antenna arrays**

Two element array: Broad side array, end fire array. Linear arrays multiplication of patterns, Bionomial array, Chebyshev array and Yagi-Uda array.

**UNIT-4:-Antenna measurements**

Effective area, Total resistance of Ariel, Effective height & radiation resistance.

**Text books:**


1. Antennas: J D Kraus
2. Antenna & Wave propagation: K. D. Prasad
3. Electromagnetic Waves & radiating system: Edward C. Jordan, Keith G. Balmain

**Subject: Digital Image Processing Code: EC-458T Credits: 4 Branch: EC Sem: VIII**

**UNIT-1: Digital Image Processing Fundamentals & Image Enhancement**

Introduction of Digital Image Processing, Origins of Digital Image Processing and its Applications, Fundamental steps in Digital Image Processing, Components of an Image Processing System, Some Basic Relationships Between Pixels, Some Basic Level Transformations, Histogram Processing, Smoothing Spatial Filters, Sharpening Spatial Filters, Filtering in the Frequency Domain, Sharpening Frequency Domain Filters.

**UNIT-2: Image Transform**

Orthogonal and unitary transforms, Transform frequency, Optimum transform, Properties of unitary transforms, DFT, Dimensional and two Dimensional, Cosine transform, Sine transform, Hadamard transform, Harr transform, Slant transform, KL transforms and their properties.

**UNIT-3: Image Restoration and Image Compression**

A Model of Image Degradation/Restoration Process, Noise Models, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Fundamental of Image Compression, Image Compression Models, Error-Free Compression, Lossy Compression.

**UNIT-4: Image Morphology and Image Segmentation**

Introduction of Morphological Image Processing, Dilation and Erosion, Opening and Closing, The Hits-or-Miss Transformation, Some Basic Morphological Algorithms, Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

**UNIT-5: Image Representation, Description and Recognition**

Introduction of Image Representation & Description, Boundary Descriptors, Regional Descriptors, Object Recognition.

**Text books:**


1. Digital Image Processing: Anil Kr. Jain
2. Digital Image Processing: Rafael C.Gonzalez & Richard E. Woods

**Subject: Satellite Communication Code: EC-456T Credits: 4 Branch: EC Sem: VIII**

**UNIT-1: Introduction** Origin of Satellite Communication**,** Brief History of Satellite Communication**,** Current State of Satellite Communication.

**UNIT-2:**
Orbital Aspects of Satellite Communication: The equations of the orbit, Describing the orbit, Locating the satellite in the orbit, Locating the satellite with respect to the earth, Orbital elements, Orbit determination. Orbital Perturbations: Effects of earth's oblateness, Effects of sun & moon. Orbital effects in Communication system performance: Doppler Shift, Range variation, Sun transit outage, Eclipse effect.

**UNIT-3: Spacecraft**
Space craft subsystems, Attitude and orbit control system, Telemetry tracking and command, Power systems, Transponders, Space qualification.

**UNIT-4: Satellite link design**
Basic transmission theory, System noise temperature and G/T ratio, Design of downlinks, Uplink design.

**UNIT-5: Modulation and multiplex techniques for satellite links**
Analog television transmission, Digital transmission of voice.

**UNIT-6: Earth station technology**
Earth station design for low system noise temperature, Large earth station antennas, Basic antenna theory, Antenna noise temperature, Design of small earth station antennas, FDM system, TDM system.

**Text books:**

1. Satellite Communication: Timothy Pratt & Charles W. Bostian.
2. Electronic Communication System; George Kennedy
3. Satellite Communication: D.C. Agarwal

**Subject: Mobile Communication Code: EC-415T Credits: 4 Branch: EC Sem: VIII**

**Unit-1: Introduction to wireless communication**
Evolution of mobile radio communication, examples of wireless comm. Systems, paging systems, cordless telephone systems, comparison of various wireless comm. systems, modern wireless communication systems : second, third and fourth generation wireless networks, WLL, WLAN, Bluetooth, PAN.

**Unit-2: Introduction to cellular mobile systems**
Spectrum allocation, basic cellular systems ,performance criteria, operation of cellular systems, analog cellular systems, digital cellular systems, frequency reuse, channel assignment , handoff strategies , capacity of cellular systems

**Unit-3: Multiple Access Techniques**
Introduction to multiple access techniques: FDMA, TDMA, CDMA, Performance of CDMA systems, Comparison of various multiple access techniques, RAKE receiver.

**Unit-4: Digital modulation techniques for wireless communication**
Performance analysis of BPSK, DPSK, QPSK, M-ary FSK, MSK, QAM, OFDM for Wireless transmission.

**Unit-5: Fading**
Propagation path loss, free-space propagation model, outdoor and indoor propagation models, multipath fading frequency dispersive, time dispersive and frequency dispersive channels, delay spread and coherence band with

**Unit-6: Diversity and basic Combining methods**
Diversity and types of Diversity: time Diversity, antenna Diversity, frequency Diversity, Combining methods: selection combiner, maximal ratio combiner, equal gain combiner.

**Text books:**

1. Wireless Communication: Theodore S Rappaport
2. IS-95 CDMA: Vijay K Garg
3. Communication Systems: Simon Haykins

**Subject: PC Interfacing Code EC-452T Credits: 4 Branch: EC Sem: VIII**

**UNIT-1:**
Introduction to computer, Personal computer, Motherboard, Microprocessor, The memory, Basic I/O interface, Operating system.

**UNIT-2:**
Communication with external devices, Timing circuits, Parallel I/O ports, Serial I/O ports, Plug in slots, PCI bus.

**UNIT-3**: Computer interfacing for data acquisition and control, Family of PCs, Operator interface, Computer languages.

**UNIT-4:**
Signals, Interfacing input signals, Analog signal conditioning, Input signal buffering and amplification, Digital signal conditioning, Electromechanical relay.

**UNIT-5:**
Output system with continuous actuators, Cabling, Digital to analog converter, Analog to digital converters.

**UNIT-6:**
Plug-in-cards, Input/output devices, Software from transducer to control room, SCXI.

**UNIT-7:**
Low cost multi-functional DA and C card, IEEE-4888 GPIB, Standard add-on-cards, Backplane bus, VME bus, VXI bus microcontrollers.

**Text books:**


1. The Intel microprocessors, architecture, Programming and interfacing: Barry B. Brey
2. Microprocessors and interfacing programming and Hardware: Douglas V.Hall.
3. Hardware and software of personal computers: Sanjay K Bose.
4. Interfacing to the IBM personal computer: Lewis C Eggerbrecht (SAMS Publication)
5. Computer control of processes: M. Chidambaram.

**Subject: DSP Processors and Architecture Code: EC-462T Credits: 4 Branch: EC Sem: VIII**

**Unit-1: Introduction to digital signal processing**
Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), linear time-invariant systems, Digital filters, Decimation and interpolation.

**Unit-2: Computational accuracy in DSP implementations**
Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

**Unit-3: Architectures for programmable DSP devices**
Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

**Unit-4: Execution control and pipelining**
Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, and Pipeline Programming models.

**Unit-5: Programmable digital signal processors**
Commercial Digital signal-processing Devices, Data Addressing modes of TMS32OC54XX DSPs, Data Addressing modes of TMS32OC54XX Processors, Memory space of TMS32OCS4XX Processors, Program Control, TMS32OCS4XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS32OC54XX processors, Pipeline Operation of TMS32OC54XX Processors.

**Unit-6: Implementations of basic DSP algorithms**
The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

**Unit-7: Interfacing memory and I/O peripherals to programmable DSP devices**
Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

**Text books:**


1 Digital Signal Processing Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2 DSP Processor Fundamentals, Architectures & Features Lapsley et al. S. Chand & Co, 2000.
3 Digital Signal Processors, Architecture, Programming and Applications B. Venkata Ramani and M. Bhaskar, TMH, 2004.
4 Digital Signal Processing Jonatham Stein, John Wiley, 2005

**Subject: Monolithic Microwave Integrated Circuit Code: EC-460T Credits: 4 Branch: EC Sem: VIII**

**UNIT:-1**
History of Monolithic Integrated Circuits.

**UNIT:-2**
Monolithic circuit components: Planar transmission lines, Lumped and distributed passive elements, GaAs MESFET, Other active devices.

**UNIT:-3**
Metal semiconductor functions and their characteristics.

**UNIT:-4**
S-parameter measurement and their use in GaAs MESFET circuit design, S-parameter: General concept, Measurement of S-parameters of active devices, On wafer S-parameter of active devices, On wafer S-parameter measurements, Utilization, S-parameter in circuit design.

**UNIT:-5**
MMIC process.

**UNIT:-6**
Optical control of MMICs.

**Code: HU-449 T** **Subject : Principle of Management** **Credits 4**
***Branches: EI , EC*** ***Semester :VII*** ***LPT:310***

**UNIT 1:** Management as a discipline: Definition, nature, scope, functions, managerial Skills,

Management. Thought-Historical Prospective, Social Responsibility, of Business.

**UNIT2:** Planning: Concept and purpose, planning process, Management, By Objectives (MBO), Decision making.

**UNIT3:** Organization: Concept and purpose of organisation, types of organisation, bases of Departmentation, concept of Authority and Responsibility, Span of Management, Line and Staff Authority, Functional Authority, Delegation of Authority, Centralization and Decentralization of Authority, Coordination Staffing.

**UNIT4:** Directing: Leadership Concept, Ingredients, Traits, Styles, Roles Communication Concept. Types, Process Barriers, Making Communication effective, Importance.

**UNIT5:** Controlling: Concept, Provides, Requirements, for adequate control, controlling and earning, Budgeting control Importance, Management Audit, Management in future.

***Subject: Operation Research*** ***Code: MA-491T*** ***Credits: 4***
***Branches: EI,EC*** ***Semester :VII*** ***LPT:310***

**UNIT 1: Introduction:** Definition of O.R. and it's scope, modeling in O.R. General methods for solving O.R. models. The Monte-carlo technique, main characteristic of O.R. main phases of O.R. Linear programming problems. Graphical method for solve L.P.P., Two phase Method, Big-M Method, problems of tie.

**UNIT 2: Assignment Model :** Mathematical formulation of assignment model, Reduction theorem, problems of maximization & minimization. Hungarian process, travelling salesman problems.

**UNIT 3: Transportation Model :** Mathematical formulation of transportation problem. Definition of BFS, IBFS, Optimum solution. Algorithms of N-W rule, Least-cost & VAM and their problem

**UNIT 4: Sequencing :** Introduction, principle assumptions processing of jobs through two, three & m machine's.

**UNIT 5: Game Theory :** Characteristic of Games. Basic definitions, minimax criterion and optimal strategy. Equivalence of rectangular Games, Dominance process, Arithmetic method for solving zero-sum-two person Games. Graphical and simplex methods for solving the games.

**UNIT 6: Replacement:** Replacement of item that fail completely.

**UNIT 7: Inventory :** Elementry Inventory Models, Inventory models with price breaks.

List of Pool Elective:

5. EI-402 PCB Design & Technology
6. EI-456 Aircraft Instrumentation
7. EC-458 Digital Image Processing
8. EC-460 Microwave Integrated circuit

***Code: EI-456 T*** ***Subject: Air-craft Instrumentation Credits 4(3-1-0)***
***Branches: EI, EC*** ***Semester :VIII LPT:310***

**UNIT 1: Requirement and standards:**

Location, visibility and grouping of Instruments, Instruments to be installed. Flight and navigational instruments. Power plant instruments.

**UNIT 2: Instrument Panels, Displays and Layouts:**

Director displays, Head up displays.

**UNIT 3: Pitot static systems:**

Probes Pressure (Position) error, measurement to altitude. Aneroid barom-eter. Air speed indicator vertical speed indicator.

**UNIT 4: Primary Flight Instruments (Attitude indication):**

The gyroscope and its properties. References established by gyroscopes. Gyro horizon.

**UNIT 5: Heading Indicating Instruments:**

The directional gyroscope.

**UNIT 6:** Measurement of fuel quantity and fuel flow:

**UNIT 7:** Integrated instruments and flight director systems.

**UNIT 8:** Flight data recording.

**TEXT BOOK:**

Air Craft Instruments by E.H.J. Pallet

**References Books:**

**1)** Measurement Systems Application and Design. By:Ernest O Doebelin Publisher-McGraw Hill
**2)** Air Craft Instruments By C.A. Williams
**3)** Air Craft Instrument Control Systems by C.A. Williams.
**4)** Air Craft Electronics and Electricity by Kroes, Bent.

**UNIT 1:** Introduction to Digital Image Processing- Image enhancement, Image rep- resentation and modelling, Image Reconstruction, Z-transform and fourier transform, Optical and modulation transfer function, Matrix theory.

**UNIT 2:** Image sampling and quantization, Two dimensional theory Reconstruc- tion, Nyquist rate, Aliasing, foldrer Ineq., Hexagonal sampling, Optimum Sampling, compounder designing, visual quantization.

**UNIT 3:** Image transforms: orthogonal and UNITary transforms, transform freq., optimum transform, properties of UNITary transforms, DFT, Dimensional and 2 Dimensional, Cosine transform, fine transform Hadamard. Harr, Slant, KL transforms and properties.

**UNIT 4:** Image enhancement: point operation, Histogram modelling, spatial operation, Multispectral image enhancement, false color and pseudocolor, color image enhancement, **Image filtering:** Inverse and wiever filtering, FIR filters, filtering using image transforms, casual models and recursive filtering.

**UNIT 5:** Image Reconstruction: Tomographies, Radon transform, Back projection operator, Projection theorem, Image data compression: Pinel coding, predictive techniques, Transform calling theory, Hybrid coding and vector DPCM, Interframe coding.

**Reference books:** Fundamentals 0f DIP By Anil K. Jain. PHI India Ltd

**PH -419 T** **Futuristic Materials** **Credits 4(3-1-0)**

***Branches: OPEN*** ***Semester :VII*** ***LPT:310***

**Semiconductors :**

Introduction of semiconductors. intrinsic and extrinsic, II-VI and IIIV semiconductors and its alloys, Advantages and necessity of the tailoring of semiconductor, Semiconductors and it alloys used of LED and other devices, Utility of semiconducting alloys like GaAIAs, GaAIN, GaAIP etc.

**Superconductors:**

Fundamenal Phenomena associated with sumerconductors. Type I & II superconductors, Meissner Ochenfeld effects, Josephon effects, fundamental of BCS theory. Novel High Temperature Superconductors. Hole superconductors, TIBa CaCuO single and bilayer. Electron superconductors NdCuO etc. Doping effects in superconductors, Organic superconductors, fullerenesl. Application of the superconductors in science, medical and commercial sectors.

**Material for Magnetic media:**

Material useful for magnetic recording head, magnetic disk, magnetic tape media, Magneto optic recording materials. Holography, data storage materials.

**Holography:**

Fundamentals of holography, Difference between conventional photography and holography. Techniques to make a hologram. Advantages of holography over other techniques.

**Introduction of following with applications :**

Fibre optics, Lasers,Ceramics, Dielectric Chactrization of Materials

**Books:**

**1)** Superconductivity Today: T.V. Ramakrishnan & C.N.R. Rao Wiley astern Pvt. Ltd, New Delhi, 1992

**2)** Solid State Physics: Ashcrost/Mervin

**EI-452T** **P.C. Interfacing** **Credit: 4**

***Branches: EI*** ***Semester :VII*** ***LPT:310***

UNIT:1 Introduction to computer personal computer-motherboard, microprocessor, the memory, basic I/O interface, Operating system.

UNIT:2 Communication with external devices, timing circuits, parallel I/O Posrts, plug in slots, PCI bus.

UNIT:3 Computer interfacing for data acquisition and control, family of PCs, operator interface, computer languages.

UNIT:4 Signals interfacing input signals, analog signal conditioning input signal buffering and amplification, digital signal conditioning electro mechanical relay.

UNIT:5 Out put system with continuous actuators, cabling digital to analog converter analog to digital converters.

UNIT:6 Plug-in-cards, Input /Output devices, software from transducer to control room, SCXI.

UNIT:7 Low cost multi-functional DA and C card, IEEE-4888 GPIB, standard add-on-cards, backplane bus, VME bus, VXI bus microcontrollers.

Reference:


1. The intel microprocessors architecture, Programming and interfacing by Barry B. Brey.
2. Microprocessors and interfacing programming and Hardware by Douglas V. Hall.


**Subject: Material Imperfection and Their Application** **Code: PH-429T**

**Credit-4** **L P T (3 1 0)**

**Structure of Crystalline Solids:** Fundamental concepts, unit cell, crystallographic directions and planes, Crystal systems, Metallic crystal structures.

**Imperfections in Solids:** Introduction, Point defects: Vacancies and self-interstitials colour centres, in purities is solids, Linear defects dislocations, Interfacial defects, Bulk or volume defects.

**Diffusion in Solid:** Diffusion, diffusion Mechanisms: vacancy diffusion, interstitial diffusion, steady state diffusion: Fick's first law, non-steady state diffusion: Fick's second law, Factors that influence diffusion, Applications.

**Amorphous Materials:** Definition, types, structure, methods of preparation of amorphous materials, Applications: optical fibers, amorphous semi-conductor, optical memories, solar cells.

**Plastic deformation & Strengthening Mechanisms:** Plastic deformation, the tensile stress-strain curve, modes of plastic deformation-slip and twinning, the shear strength of perfect and real crystals, the stress to move a dislocation, mechanisms of strengthening in metals by grain size reduction, solid solution strengthening, strain hardening.

**Lasers:** Principle, population inversion, Einstein's and B coefficients, types: Ruby laser, he-Ne laser, semi conductor lasers.

Books: Non Crystalline materials: by Davis & Mott

Amorphous Solids: by S.R. Elliot

Solid State Physics: by M.A. Wahab

**Subject: Polymeric Materials and Their Applications** **Code:CY-401T**

**Credit-4** **L P T (3 1 0)**

1. **Basic Polymer Chemistry:** Definition, Classification, Types of polymerization.

2. **Resins and Plastics:** Thermoplastic and thermosetting resins, constituents of plastics, fabrication of plastic materials, Important resins, Cellulose derivatives, Polyethylene, Teflon, Polystyrene, Polyvinylacetate, PVC, Nylons, Phenolic resins Phenol-Formaldehyde, Urea and Malamine-Urea and melamine-Formaldehyde resins, Epoxy resins, Polyester, Silicones, Lon exchange resins.

3. **Rubbers/Elastomers:** Natural rubber, compounding of rubber, Properties, uses, reclaimed rubber, Synthetic rubber, Buna-S, Nitrile rubbers, Fibre reinforced plastics (FRP).

4. **Biopolymers:** Importance and applications of few important biopolymers eg. Proteins, carbohydrates etc.

**Subject: Engineering Economics** **Code: HU-402T**

**Credit-4** **L P T (3 1 0)**

**UNIT:1** **Economics Micro and Macro:** Definition, Importance and Uses, Interdependence between Micro and Macro Economics.

**UNIT:2** **Concept in Economics:** Law of Demand, Law of Diminishing Marginal Utility, Law of Equi-marginal Utility, elasticity of Demand, Indifference Curve Analysis-Price effect. In-come effect and substitution effect.

**UNIT:3** **Theory of Production:** Production Function, Laws of Variable proportions, Laws of Returns of to Scale, Cost Function-Meaning of Fixed Cost and Variable Cost, Location of Firms, Wabers theory of Location of the firms.

**UNIT:4** **Theory of the Firm:** Perfect Competition, Monopoly and monopolistic Competition:- Meaning, Assumptions, Equilibrium of the firm in Short run and Long run period of time.

**UNIT:5** **International Trade:** Meaning, Nature and Scope of International Trade, Types and Effects of Tariffs and Quotas, Objective and Functions of International Monetary Fund (I.M.F.).

**Subject: Quantitative Methods in Economics** **Code: (HU-409T) Credit-4**

**L P T (3 1 0)**

**UNIT:1** **Statistics:** Definition, Importance, Scope and Limitations of statistics, primary and secondary data. Classification of Meaning objectives and types of classification. Frequency Distribution-Discrete, Grouped and continuous frequency distributions. Fundamentals of frequency distribution.

**UNIT:2** **Measures of Central Tendencies:** arithmetic mean, Median, Mode, Geometric Mean and Harmonic Mean, Demerits and Uses of all methods.

**UNIT:3** **Measures of Dispersion:** Mean deviation Method about Mean, Median and Mode, Merits and Demerits of Mean Deviation. Coefficient of M.D. Standard Deviation (S.D.) Method with simple short-cut and step deviation methods. Merits and Demerits of S.D. Coefficient of S.D.

**UNIT:4** **Correlation:** Introduction, Types of Correlation, Karl Pearson's Coefficient of Correlation. Interpretation of 'r'. Probable Error, Uses of Probable Error.

**UNIT:5** **Linear Regression Analysis:** Introduction, Two method of Linear Regression Analysis:- (1) Line of Regression of Y on X and (2) Line of Regression and X on Y. Why two lines of regression Coefficient of Regression. Relation between the coefficient of correlation and Regression.

**UNIT:**6 Index Number: Definition, Uses and Types of Index Numbers, Methods of Construction Index Numbers-(1) Simple Aggregate Method (2) Weighted Aggregate Method (3) Fisher's Ideal Index Numbers (4) const of living Index Numbers (5) Chain Base Index Numbers. Base Shifting. Limitations of Index Numbers.

**Subject: Foreign Trade** **Code: HU-407T**

**Credit-4** **L P T (3 1 0)**

**UNIT:1** **Nature of foreign Trade:** Meaning, Nature, Scope and Distinct Features of International Transactions.

**UNIT:2** **Theories of International Trade:** The Classical Theory:-Absolute Advantage Model of Adam Smith, comparative Advantage Model of David Ricardo, the Neo-classical Analysis:-International trade Equilibrium under Constant cost, Increasing Cost and Decreasing cost conditions.

**UNIT:3** **Tariffs and Quota:** types and Effect of tariffs and Quotas, Quota vs. Tariff.

**UNIT:4** **International Monetary fund (I.M.F.):** Nature, Objectives and functions of I.M.F. International Monetary System, since the demise of Bretton Woods System.

**UNIT:5** **International Financial Institutions:** World Bank (IBRD, International Financial Corporation (I.F.C.), International Development Association (I.D.A.).

**UNIT:6** **India's Trade Policy:** Trends of Exports and Imports of India since independence, Composition o India's Foreign Trade.

***Subject: fuzzy logics and neural networks*** ***Code: EI-412T*** ***Credits: 04***

***Branches: all*** ***LPT:310***

**Unit-I**

**Neural Networks-1(Introduction & Architecture)** Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory

**Unit-II**

**Neural Networks-II (Back propogation networks)** Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propogation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting backpropagation training, applications.

**Unit-III**

**Fuzzy Logic-I (Introduction)** Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

**Unit-IV**

**Fuzzy Logic –II (Fuzzy Membership, Rules)** Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

**Unit-V**

**Fuzzy Neural Networks:** L-R Type fuzzy numbers, fuzzy neutron, fuzzy back propogation (BP), architecture, learning in fuzzy BP, inference by fuzzy BP, applications.

**Text Books:**

1. Kumar Satish, “Neural Networks” Tata Mc Graw Hill

2. S. Rajsekaran & G.A. Vijayalakshmi Pai, “Neural Networks,Fuzzy Logic and Genetic

Algorithm: Synthesis and Applications” Prentice Hall of India.

**Reference Books:**

3. Siman Haykin,”Neural Netowrks”Prentice Hall of India

4. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India

***Subject: Optical Fibre Communication*** ***Code: EC-435*** ***Credits: 4***

**UNIT:1** Historical development, the general system, Advantage of optical fiber communication.

**UNIT-2:-Optical fiber waveguides**

Total internal reflection, Acceptance angle, Numerical aperture, Skew rays, Modes in planer guides, Phase and group velocity. Cylindrical fiber Modes, Mode coupling, Step index fibers, Graded index fibers.

**UNIT-3:-Transmission Characteristics of optical fibers**

Attenuation, Intrinsic absorption, Intrinsic & Extrinsic absorption, Linear & non-linear scattering, Rayleigh scattering, Mie scattering, Stimulated Brillouin scattering, Stimulated Raman scattering, Fiber bend loss, Mid infrared and far infrared transmission, Dispersion.

**UNIT-4:-Optical fibers and cables**

Preparation of optical fibers, Liquid phase (melting) techniques, Vapour phase deposition techniques, Fluoride glass fibers, Optical fiber, Optical fiber cable, Stability of the fiber transmission characteristics.

**UNIT-5:-Optical sources**

LASER, Basic concepts of LASER, Optical emission from semiconductors, Injection LASER characteristics, LED characteristics, Modulation.

**UNIT-6:-Optical detectors**

Device types, Optical detection principles, Quantum efficiency, Semiconductor photodiode, Midinfrared photo diodes, Photo transmitter, Photo conductive detectors.

**UNIT-7:-Optical fiber systems**

Basic system, Modulation formats, Demodulation schemes, Optical transmitter, Optical receiver, Optical power budgeting.

**UNIT-8:-Optical Fiber Measurements**

Fiber numerical aperture measurements, Reflection and optical return loss, Field measurement, Fiber attenuation measurements.

**UNIT-9:-Applications and future developments**

Military applications, Computer applications, Local area networks, Public network application, Medical applications.