

THIRD SEMESTER

SUBJECT : ELECTRONICS DEVICES & CIRCUITS

UNIT-I	Semiconductor Diodes : P-N junction diode, open circuited junction, Forward and reverse bias, V-I characteristics, dynamic resistance, temperature dependence, Avalanche and zener breakdown, Schottkey diode, photodiode, LED's, LCD, Varactor diode, Tunnel diode. Power supplies, Half-wave & Full-wave rectifiers, Voltage doublers, Filters, Ripple factors, Zener and Emitter follower and series regulators.	20
UNIT-II	Junction Transistors : Theory of operation, static characteristics, Break down voltages, current voltage power limitations, Biasing of BJT different biasing arrangement, stability factor, Thermal runaway, Power transistors.	10
UNIT-III	BJT Analysis Small signal analysis CE, CB, CC amplifiers and comparison, High frequency analysis calculation of frequency response, Gain bandwidth product.	20
UNIT-IV	Power Amplifiers Classification A, B, AB, C classes efficiency, Push pull configuration (A, B, AB) complimentary symmetry, second harmonic and cross over distortion.	10
UNIT-V	Positive and Negative feedback amplifiers Feedback amplifiers, Classification, Practical circuits applications, Advantages. Oscillators, Stability, Barkhausen Criterion RC, LC, & Crystal oscillators.	10
UNIT-VI	FET and its analysis. Field effect transistors & MOSFET, Principle of operation and characteristics, biasing arrangement, small signal analysis of CG, CD, CS high frequency analysis.	10

SUBJECT : ELECTRONICS MEASUREMENT

UNIT-I	Statistical analysis of measurement of errors, accuracy, precision types of errors, Fundamental and Derived units, conversion of units, classification of standards, standards for mass, length, time, volume, frequency, temperature light intensity, electrical properties.	12
UNIT-II	galvanometer, DC voltmeter, Ammeter, Multimeter, Watt-hour meter, Three phase wattmeter, Power factor meter, instrument transformer. Measurement of Low, Medium and High resistance.	10
UNIT-III	Bridges: Wheat stone, Kelvin, Max-well, Ray, Schering, Wienbridge Potentiometer, Measurement of Inductance, Capacitance using AC bridges.	12
UNIT-IV	Amplified DC meters, AC voltmeter using rectifiers, True/RMS voltmeters, Electronics multimeter, Digital voltmeter, Component measuring instrument, Q-meters, RF power and voltage measurement.	06

- UNIT-V** Oscilloscopes : Block diagram, CRT, deflection system, delay line, multiple trace, triggering, delayed sweep, digital storage oscilloscope. **10**
- UNIT-VI** Frequency : Time and power measurement, signal analysis. **05**

SUBJCET : NETWORK THEORY

- UNIT-I** Nodal and Mesh-basis equilibrium equation, matrix approach for complicated network containing voltage current sources and reactances, source transformations, duality, Mesh basis equation for coupled circuits. **12**

- UNIT-II** Network theorems: Superposition's, Reciprocity, Thevenin's, Norton's, Maximum power transfer, compensation, Tellegen's theorem as applied to A.C. circuits. **12**

- UNIT-III** Trigonometric and exponential Fourier series, Discrete spectra and symmetry of waveforms, steady state response of a network to non-sinusoidal periodic inputs. Power factor, effective values, Fourier transforms and continuous spectra, three phase unbalances circuits and power calculations. **12**

- UNIT-IV** Laplace transforms and properties, partial fractions, singularity functions, waveform synthesis. Analysis of RC, RL and RLC networks with and without initial conditions with Laplace transforms, evaluation of initial conditions. **08**

- UNIT-V** Transient behavior, concept of complex frequency, Driving points and transfer functions, poles and zeros of immittance functions, their properties, sinusoidal response from pole-zero locations, convolution theorem and integral solutions. **08**

- UNIT-VI** Two port network parameters and inter-connections, behavior of series and parallel resonant circuits. Introductions to band pass, low pass, high pass and band reject filters. **07**

SUBJCET : C AND DATA STRUCTURES

- UNIT-I** Structure of C programs – Data types storage classes, scope of variables, expression and operators. **08**

- UNIT-II** Program control statements – for, if, while, switch concept of function and recursion. **12**

- UNIT-III** I/O through print f, scan f functions, file I/O open, close read and write. **08**

- UNIT-IV** Arrays searching (Linear & Binary) sorting (Bubble, Selection sort). **06**

- UNIT-V** Pointers and Structures, singly linked list insertion, deletion, updation. **10**

UNIT-VI Study of following numerical method with reference to algorithms development and error analysis. **12**
– Newton Raphson Method
– Gauss Seidal Method
– Runga Kutta Method (second order)

SUBJECT : APPLIED MATHEMATICS – III
(Section – A)

UNIT-I Complex Variables: Analytic function, Cauchy-Riemann conditions, Conjugate functions, Singularities, Cauchy's integral theorem and integral formula (statement only), Taylor's and Laurent's theorem (statement only), Residue theorem, Countour integration. **12**

UNIT-II Integral Transforms : Fourier integral theorem, Fourier and Laplace transforms and their simple properties, simple applications for Laplace transforms to solve ordinary differential equations including simultaneous equations, solution of one dimensional fusion and wave equation by transform method. The Z-transformation and properties, inversion, relation with R Laplace transform, Application of Z-transform to solve difference equation with constant coefficients. **09**

UNIT-III Calculus Of Variations: Maxima and Minima of functions, Variation and its properties Euler's equation, Functions dependent on first and second order derivatives, Simple applications. **04**

(Section – B)

UNIT-IV Fourier Series: Periodic functions and their Fourier expansion, even and odd functions, change of interval, half range expansions. **06**

UNIT-V Partial Differential Equation: Partial Differential Equation of first order first degree i.e. Lagrange's form, Linear, Homogeneous p.d.e. of n th order with constant coefficient, Method of separation of variables. Application to transmission lines. **06**

UNIT-VI Matrices: Inverse of matrix by adjoint method and its use in solving simultaneous equations, Rank of matrix, consistency of system of equation, linear dependence, Linear and orthogonal transformations, Characteristics equations, eigen values and eigen vectors, Reduction to diagonal form, statement and verification Caylay – Handwilton Theorem, Association of matrices with linear differential equation of second order with constant coefficient. Find the inverse by partitioning method. **12**

FOURTH SEMESTER

SUBJECT : ELECTROMAGNETIC FIELDS

UNIT-I Gradient, Divergence & Curl of a vector & their physical interpretation. Divergence & Stoke's theorems, their proof and validity for vector fields. Irrotational and solenoidal fields. The uniqueness and Helmholtz theorems. **15**

- UNIT-II** Electrostatic fields, Coulomb's law, Electric field for different charge distributions. Gauss law and its applications. Electric potential for different charge distributions. Poisson's and Laplace equations. **20**
- UNIT-III** Magnetic fields, Lorentz law, Biot-savart law, Magnetic field due to different current distributions. Cause law and Ampere's law magnetic vector potential and magnetic flux. Magnetic vector potential for different current distributions. Lenz's and Faraday's laws, Energy stored in a magnetic field. **20**
- UNIT-IV** Electric scalar potential, solution of Laplace equation in two dimensions using method of separation of variables, displacement current. Maxwell's equations for time varying fields and their Physical significance. Boundary conditions of the vector fields. **10**
- UNIT-V** Poynting Vector theorem and its proof, Uniform plane wave, Wave equation and solution in free space, relation between E. & H. vectors, intrinsic impedance, wave equations and their solutions and conducting and dielectric media. **07**
- UNIT-VI** Plane waves, normal and oblique incidence on a perfect conductor and dielectric, reflection and refraction, Shell's law, Brewster angle, Polarization. Linear, Circular and Elliptical. **05**

SUBJECT : DIGITAL CIRCUITS

- UNIT-I** Analog V/s Digital systems, Transistor as a switch, Boolean Algebra, Boolean Identities, Logic Problems, Binary, Gray, Octal, Hex and ASCII codes, Gates and their truth tables, D'Morgan's laws, Sum of Products and Product of Sums. Logic families : TTL, ECL, CMOS etc., Fan-in, Fan-out, Propagation delay properties. **12**
- UNIT-II** Combinational logic: concepts, SSI, MSI&VLSI Circuits classification Standard TTL, CMOS characteristics, Decoders, Encoders, Multiplexers, Demultiplexers, Code converters, Characteristics of display devices, Standard configuration of gates as SSI/MSI/LSI circuits. **10**
- UNIT-III** Karnaugh Map, Simplification of sum of products and products of sum, solution to problems using K-Maps, conversion of Decoders/MUX into one another use of MUX as a function generator. **08**
- UNIT-IV** Introduction to Flip-Flop, Latches, Concept of clock, Memories Flip-Flop as basic cell, RAM, ROM, EPROM and EEPROM and overview, Master slave combination and conversion of one type to another type Flip-Flop. **10**
- UNIT-V** Excitation tables and introduction to sequential circuits counters synchronous / asynchronous. Different module counters with reset/clear facility Design of counters of arbitrary module with K-maps, Lock free counters. **10**
- UNIT-VI** Arithmetic Circuits: Adders, Subtractors, (Half & Full), BCD adder/subtractor concept of ALU and its design. Integrated circuits version of multivibrator and their design parameters. **08**

SUBJECT : BASIC ELECTRICAL MACHINES

- UNIT-I** Transformer: Single Phase and three phase effect of loading, regulation, open circuit and short-circuit tests, efficiency, all day efficiency, parallel operation, Auto transformers. **15**
- UNIT-II** D. C. Generators, series, shunt and compound. Commutator armature EMF, armature reaction and commutation, equivalent circuit, characteristics, parallel operation, Applications. **12**
- UNIT-III** D. C. Motor: Series, shunt and compound, Back emf. Characteristics, starting, speed control, applications. **08**
- UNIT-IV** Three phase Induction Motor: Principle of operation, type, torque and slip equivalent circuit, No load and Blocked rotor test, starting, speed control and applications. **15**
- UNIT-V** Single Phase Motors: Principle of operation of single phase induction motor starting methods, principle of a. c. series motor, Universal motor. **08**
- UNIT-VI** Three Phase Synchronous Machines: Motor and Generator action synchronous impedance and excitation voltage, Equivalent circuit, voltage regulation, starting of motor, effect of excitation variation in case of motor. **12**

SUBJECT : ELECTRONICS ENGINEERING MATERIAL & COMPONENTS

- UNIT-I** Dielectric Properties of insulators in static fields, Polarization, dielectric constant, dielectric behaviour of monoatomic & polyatomic gases, liquids & solids, polar & non polar dielectrics. Clausius–Masotti equation, ferroelectric, piezo electric & pyroelectric materials. **08**
- UNIT-II** Dielectric properties of insulators in alternating fields, complex dielectric constant, dipolar relaxation dielectric loss, loss tangent, dielectric breakdown, fixed and variable capacitors, electrolytic, paper, plastic, ceramic & mica capacitors used in electronic circuits, Dielectrics used in cables & transformers. **08**
- UNIT-III** Conductivity of pure metals & alloys, temperature coefficient of resistivity, high conductivity materials, high resistivity materials, heating elements, fuses, contact materials, connectors, switches, heat sinks, solenoids, fixed and variable resistors non linear resistors, resistors used in electronic Circuits, Superconductivity, type I & II materials, high temperature superconductivity, applications of superconductivity. **10**
- UNIT-IV** Spin & orbital magnetic dipole moment of electron., dia, para, ferro, ferri & anti ferromagnetism, soft and hard magnetic materials, ferrites, magnetic cores of conductors, transformers, relays, electric machines & memory elements, magnetic resistors magnetic tapes. **10**
- UNIT-V** Semiconductors, band gap, electron & hole mobilities. Purification & doping of semiconductor materials, characteristics of semiconductor devices, diodes, zener & breakdown diodes, tunnel diodes, varactors.

Transistors (BJT, FET, MOSFET, UJT). Diac, SCR & Triac, Hall effect devices. **08**

UNIT-VI

Fabrication of linear & digital Ics LSI, VLSI, CMOS devices. Optoelectronic devices, LCD, LED, phototransistors. Optical couplers, detectors optical fibres, lasers. **06**