SYLLABUS

Five year Integrated U.G. Programme in Electronics

Semester I

Paper-I (BE-101): Network theorems and A.C. Circuits

UNIT-I: **Network theorems**: conventional and electron flow, Concept of voltage source, Concept of current source, Kirchoff's current and voltage law, superposition theorem, reciprocity theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, impedance, parameters for two-port network, principle of duality, reduction of complicated circuit method T and π form, conversion of T and π sections

Unit- II: **A.C. Fundamentals**: Simple waveforms, complex wave forms, time period, frequency, amplitude, different forms of emf equations, phase, phase difference, root mean square value, average value, form factor.

Unit – III: **Phasor algebra**: symbolic notation, significance of operator j, conjugate complex number, various forms of vector representations, arithmetic operations of vector, powers and roots of a vector quantity

Unit IV: **AC through RC, RL, RLC** series and parallel circuits, resonance in series and parallel RLC circuits, graphical representation of series and parallel resonance circuits, band width and Q – factor of series RLC circuits

Text books

1. Basic Electronics Thareja B.L.
2. Principles of Electronics by Mehta V.K.

Reference books

1. Basic Electronics by Grob Bernard

Paper-II (BE-102): Basic Electronics I

UNIT-I: Energy Bands in Solids, Electrical conductivity, Carrier Concentration and Fermi level of intrinsic Semiconductor, Donor and Acceptor, Carrier density and Fermi level in extrinsic semiconductor (Qualitative Idea). Dependence of Fermi Level on donor and acceptor concentration, Idea of carrier mobility, Drift and Diffusion current, Einstein relation,

UNIT –II: P-N junction: barrier formation, barrier potential, transition capacitance, qualitative mechanisms of junction breakdown: avalanche breakdown and zener breakdown, Zener diode.

Unit III: Idea of biasing, biasing of P –N junction, current across P – N junction, diode equation, diode resistances, load line of diode circuit

Unit IV: Half wave and full wave rectifier, bridge rectifiers, ripple factor, rectification efficiency, clipping and clamping circuits, basic working idea of solar cell, LED.

Text books:

1. Electronic Principles by Malvino A.P.
2. Basic Electronics by Grob Bernard
3. Basic Electronics by Thareja B.L.
4. Principles of Electronics by Mehta V.K.
5. Fundamentals of Microelectronics by Behzad Razavi

Paper-III (BE-103)

List of Experiments

1. Introduction to Basic Electronic Components (resistor, capacitor, inductor, diode)
2. Introduction to Test and Measurement Instruments (power supply, signal generator, multimeter, CRO)
3. Verify the Thevenin, Norton and Superposition Theorem.
4. Verify the Maximum Power Transfer Theorem.
5. To study forward biased and reversed biased characteristics of p-n junction diode.
6. To study the characteristics of the Zener diode.
7. To determine the band gap of the semiconductor.
8. To determine the capacitance of a capacitor by studying the variation of voltage during its charging and discharging
9. To determine the resonance frequency of LCR series circuit
10. Study of half wave rectifier
11. Study of Full wave rectifier
12. Study of ripple factor of half wave and full wave rectifier

Semester II

Paper IV (BE-201):
DIGITAL ELECTRONICS I

Unit I: Number systems, Binary number system, Binary to decimal conversion, Decimal to binary conversion , Binary operations: addition, subtraction, complement of a number - 1's complementary subtraction, 2's complementary subtraction , binary multiplication, binary division, Representation of binary number as electrical signals, octal number system, octal to decimal conversion – decimal to octal conversion, binary to octal conversion, octal to binary conversion, advantages of octal number system, hexadecimal number system, binary to hexadecimal conversion, hexadecimal to binary conversion.

Unit II: Introduction, Laws of Boolean Algebra, Equivalent switching circuits, De Morgan's theorem**,** Logic circuits, Definition, Positive and Negative Logic, OR Gate, Equivalent circuit of an OR Gate, AND Gate, Equivalent circuit of an AND Gate, NOT Gate, Equivalent circuit of a NOT Gate, Exclusive OR Gate, Diode OR Gate, Diode AND Gate, Transistor OR Gate, Transistor AND circuit.

Unit III : NOR Gate, NOR Gate as a Universal Gate, NAND Gate, NAND Gate as a Universal Gate, XNOR Gate**,** Adders and Substractor, Half Adder, Full Adder, Half Substractor, Full Substractor, Half Adder using NAND Gate, Full Adder using NAND Gate.

Unit IV : Flip Flop, Master Slave Flip Flop, R-S Flip Flop, Master Slave J-K Flip Flop, Counters, The 7493 A four Bit Binary Counter Shift Register, Serial in – Serial out shift Register.

References:

1. Modern Digital Electronics by R.P.Jain
2. Principles of Electronics. V. K. Mehta, Rohit Mehta
3. Digital Computer Electronics: Malvino and Brown
4. Digital Electronics by Malvino and Leech

Paper-V (BE-202): Basic Electronics II

Unit I: Filter circuits, Inductor and capacitor filter, L – section filter, Π - section filter, voltage regulation

Unit II: Idea of BJT, PNP & NPN transistors, transistor parameters, CE, CB, and CC configurations, transistor characteristic curves, Active, cutoff and saturation region, Load line, Operation point

UNIT-III: Field Effect transistor, construction and working of JFET, channel width, various parameters of JFET, derivation of voltage and current gain, input and output impedance, expression for drain current, voltage gain of JFET, JFET as an amplifier, MOSFET, characterization.

Unit IV: BJT amplifiers, equivalent circuit of a transistor, analysis of single stage CE amplifier, practical circuit of CE amplifier

References:

1. Electronic Principles by Malvino A.P.
2. Basic Electronics by Grob Bernard
3. Basic Electronics by Thareja B.L.
4. Principles of Electronics by Mehta V.K.
5. Electronic Devices and Circuit Theory by Boylestad and Nashelky
6. Fundamentals of Microelectronics by Behzad Razavi
7. Electronic Devices and Circuits by Russel L. Meade and Robert Diffenderfer

Paper-VI (BE-203)

List of Experiments

1. To verify AND, OR, NOT gates.
2. To study the I-V Characteristics of the Common Emitter configuration of BJT.
3. To study the I-V Characteristics of the Common Base configuration of BJT.
4. To study the I-V Characteristics of the Common Collector configuration of BJT.
5. To study the I-V Characteristics of the Common Source FET configuration.
6. To study the I-V Characteristics of the Common Gate FET configuration.
7. To study the I-V Characteristics of the Common Drain FET configuration.
8. To study the I-V Characteristics of MOSFET.
9. To study the Half wave rectifier and study the effect of C filter.
10. To study the Full wave rectifier and study the effect of C filter.
11. To study a Single Stage CE amplifier.

Semester III

Paper VII (BE-301): DIGITAL ELECTRONICS II

Unit – I: Digital Logic Families

Bipolar and unipolar logic families, characteristic &digital ICs, Resistor – Transistor logic (RTL), Diode – Transistor logic (DTL), Transistor – Transistor logic (TTL), MOS & CMOS logic families

Unit II: Flip – Flops and sequential logic design:

1-Bit memory cell, clocked S-R FLIP – FLOP, J-K FLIP- FLOP, D-type Flip – Flops, T-type Flip-Flop, Excitation table of Flip-Flop, Applications of Flip – Flops

Registers, Shift register, serial in and serial out shift register, application of shift register, ripple and synchronous counters

UNIT- III: Convertors and Memories:

Digital to Analog converters, weighted registor D/A converter, R – 2R Ladder D/A converter, ADC, Successive approximation, A/D Converter, counter ramp type ADC; Memories: General memory operation, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAPROM.

UNIT-IV: Tuning Circuits: Multivibrators, astable, monostable and bistable multivibrator, circuit diagram analysis and operation, Timer IC 555 and its uses, Voltage to frequency (V/F) converters and Frequency to voltage (F/V) converters.

References:

1. Principles of Electronics by Mehta V.K.
2. Modern Digital Electronics by R.P. Jain
3. Digital Electronics: Malvino and Leech

Paper VIII (BE-302): BASIC Electronics III

UNIT-I: Parallel resonant circuit, quality factor, frequency response and R – C coupled amplifier, basic circuit for tuned amplifier, equivalent circuit of a single tuned transistor amplifier and determination of its gain and bandwidth, idea of cascading of tuned amplifiers.

UNIT-II: Amplifiers: classification of amplifier class A, class B and class C amplifiers, transformer coupled, power amplifiers, analysis and design consideration of push pull amplifiers

UNIT-III: Feedback in amplifiers, principal of positive and negative feedback, gain of negative feedback amplifier, advantage of negative feedback in amplifiers, Classification of oscillators, Phase Shift Oscillators, Working of Hartley, Colpitt and Wien bridge oscillators, Astable multivibrator

UNIT-IV: Operational amplifiers, requirements of an ideal OP-amplifier, gain of inverting and non-inverting OP-amplifier, basic idea of common mode gain, difference gain, common mode rejection ratio, application of OP-amplifier (addition, multiplication, integration and differentiation)

References:

1. OP-AMP and Linear Integrated Circuits: Gayakwad
2. Electronic Fundamentals and Applications : J.D. Ryder

3.

Paper-IX (BE-303)

Experiments list

1. To determine the resonance frequency of LCR parallel circuit
2. Study of operational amplifier as adder and subtractor
3. Study of operational amplifier as differentiator and integrator
4. Study of Operational amplifier type 741
5. Study of monostable Multivibrator using transistor
6. Study of astable Multivibrator using transistor
7. Verification of NOR gate as universal gate
8. Study of Hartley Oscillator
9. Study of Colpitt's oscillator
10. Study of Phase Shift Oscillator
11. To build Flip-Flop Circuits using elementary gates (RS, Clocked RS, D-type, and JK Flip-Flop).
12. Design a 4 bit Counter using D/T/ JK Flip-Flop.
13. Design a shift register from D/T/ JK Flip-Flop to study Serial and parallel shifting of data.
14. To design a digital to analog and analog to digital converter of given specifications.

Semester IV

Paper – X (BE-401): Electromagnetic Theory

Unit–I: Vectors & scalars, addition, subtraction, multiplication (dot and cross products); concept of Scalar and Vector fields, Gradient of a scalar field and its geometrical interpretation, Divergence and Curl of a vector field, line, surface and volume integral. Flux of a vector field, Gauss's Divergence Theorem, Stokes Theorem.

Unit–II: Gauss's Law and its application for finding electric field, calculation of electric field for symmetric charge distributions (Infinitely long rod of uniform charge density, Infinite plane of charge, & Non – conducting solid sphere), Field at the surface of a conductor, Dielectrics, polarization and polarization vector (P), displacement vector (D), electric susceptibility, dielectric constant, relation between E, D, & P. Gauss's law in presence of dielectric, energy in dielectric system, current density, charge density, non steady current and continuity equation.

Unit–III: Ampere's law and it's application for finding the magnetic field inside and outside a current carrying wire, Solenoid and Toroid. Faraday's law of induction, Lenz law, Motional Electromotive force, Induced electric field, Energy stored in magnetic fields, Magnetization, magnetic susceptibility and permeability, Magnetic materials, types of magnetism: paramagnetism, diamagnetism and ferromagnetism.

Unit IV: Concept of Maxwell's Displacement current, Guass's law of Magnetism, Maxwell's equations, Electromagnetic field energy density, Poynting's vector and pointing theorem,

Text Books:

1. Electricity and Magnetism: Tiwari and J.D.Dubey
2. Fundamentals of Electromagnetic Theory: Reitz, Milford and Christy
3. Introduction to Electromagnetics by Griffiths
4. Electromagnetism by Pramanik

Paper – XI (BE-402)

Numerical Techniques

Unit 1
Numerical Methods: Floating point, Round-off error, Error propagation, Stability

Solution of Transcendental and Polynomial Equations f(x)=0: Bisection method, Secant and Regula Falsi Methods, Newton Raphson method, Muller Method, Rate of convergence, General Iteration Methods, Roots of Polynomial Equations.
Unit 2
Interpolation and Polynomial Approximations: Taylor Series and Calculation of Functions, Langrange Interpolation, Newton Divided Difference Interpolation (forward and backward difference formulae), Truncation errors.
Curve Fitting: Least square fitting, Curve fitting.

Unit 3
Numerical Integration: Trapezoidal Rule, Error bounds and estimate for the Trapezoidal rule, Simpson's Rule, Error of Simpson's rule, Gauss Integration formula.
Numerical Differentiation: Finite difference method.
Numerical methods for first order differential equations: Euler-Cauchy Method, Classical Runge Kutta method of fourth order. Methods for second order equations.

Unit 4
Numerical Methods in Linear Algebra: Linear systems Ax=B, Gauss Elimination, Partial Pivoting, Matrix Inversion, Gauss-Jordon Methods
Matrix Eigenvalue: Power Method.

References:

1. R.V. Dukkipati, Numerical Methods, New Age International (2010)
2. S. S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall India (2008).
3. M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods:
4. Problems And Solutions, New Age International (2007) A. K. Ghatak, I. C. Goyal and S. J. Chua, Mathematical Physics:
5. Differential Equations and Transform Theory, McMillan India (2006)

Paper-XII (BE-403)

Experiments list: Experiments are to be performed using C or C++

1. To solve Transcendental and Polynomial equations.
2. To find the Complex Roots of equations.
3. Interpolation and Polynomial Approximations.
4. Curve Fitting.
5. Numerical Integration.
6. Numerical Differentiation.
7. Solution of Differentiation Equation
8. To find the Roots of Linear Equations

Semester V

Paper-XIII (BE-501): Microprocessors and Microcontrollers

Unit I:Fundamentals of Microprocessors:
Introduction, An ideal microprocessor, the data bus, address bus, control bus, microprocessor based system- basic operation, microprocessor operation, microprocessor architecture, instruction set, 8085 and 8086 microprocessor

Unit II:
Programming of microprocessors: Introduction, assembly languages, High-Level Language, application of various language, stacks, subroutines, system software, Programmable DMA controller, Programmable interrupt controller (PIC), programmable communication interface

Unit III:
Microprocessor based data Acquisition system: Introduction, analog to digital convertor, clock for A/D convertor, sample and Hold circuit, Analog multiplexer, ADC 0800,

Unit IV:
Microprocessor applications: Delay subroutines, 7-segment LED display, Microprocessor based protective relay, Microcomputer development system, single chip microcomputer, I/O processor, Coprocessor.

References:

1. Fundamental of Microprocessor and microcomputers by B. Ram
2. Digital Computer Electronics- an introduction to microcomputers by A. P. Malvino
3. Digital Computer Electronics by Malvino and Brown

Paper-XIV (BE-502): Wave Propagation

Unit I

Electromagnetic Wave Propagation: Waves equation, monochromatic plane wave, wave propagation in free space/vacuum, Wave propagation in linear medium, Wave propagation in conducting and non conducting media, energy and momenta of electromagnetic waves, radiation pressure

Unit II

Plane Waves in Dispersive Media: Absorption and Dispersion, phase velocity and group velocity, normal and anomalous dispersion, Cauchy's formula, coefficient of dispersion, pulse broadening in dispersive and lossy media.

Unit III

Transmission Line Equations: Propagation of Sinusoidal Voltages, Complex Analysis of Sinusoidal Waves and Phasor, Characteristic Impedance, Lossless, Distortion less, low loss lines

Unit IV

Wave Reflection at Discontinuities, Reflection Coefficient, Voltage Standing Wave Ratio, Input Impedance, Power, Shorted Line, Open-Circuited Line, Matched Line, Transmission Line Applications.

References:

1. Engineering Electromagnetics by Hayt and Buck
2. Elements of Electromagnetics by Sadiku
3. Field and Wave Electromagnetics by Cheng D.C.

Paper XV (BE-503): Analog Communication I

Unit I: Waveform spectra and Noise

Introduction, sinusoidal wave forms, fourier series for a periodic waveform, fourier coefficients, spectra for the trigonometric Fourier series, rectangular and saw tooth waveform, general properties of periodic waveforms, exponential Fourier series, Noise, types of noise e.g. external noise, internal noise, noise calculation, noise figure noise temperature.

Unit II: Communication system & Block diagram

Introduction, components of communication system: amplifier, transmitter, channel receiver, band spectrum modulation, types of modulation, modulation factor importance of modulation factor, forms of modulation.

Unit III

Angle modulation: Frequency and Phase modulation, frequency spectrum, bandwidth requirement, Frequency and Phase Deviation, Modulation Index, NBFM and WBFM, Multiple frequencies FM, equivalence between FM and PM, Generation of FM, FM detector.

Unit IV

Amplitude modulation: modulation index, frequency spectrum, generation of AM (balanced modulator, collector modulator), Amplitude Demodulation (diode detector). Double side band suppressed carrier (DSBSC) generation, Single side band suppressed carrier (SSBSC) generation.

References:

1. Analog and Digital Communication Systems by Roden
2. Electronic Communication by Roddy Coolen
3. Modern Electronic Communication by Miller, Beasley
4. Electronic Communication System by Schweber

Paper XVI (BE-504): Electronic Instrumentation & Digital Signal Processing

Unit I

Basic Measurement Instruments: DC measurement: dc voltmeter, ohmmeter and ammeter. Digital type voltmeter, ammeter and ohmmeter, digital multimeter, AC measurement, voltmeter, ammeter. Digital frequency meter: elements of frequency meter, universal counter and its different modes, measurement errors and extending the frequency range. Digital LCR-Q meter, digital wattmeter.

Unit II

Signal Generators: Types of generators and their operation: The sine wave generator, Audio oscillator, Function generators, Pulse generators, AF signal generator, RF generators, Random noise generators.

Unit III

Probes and Connectors: Test leads, active and passive probes, shielded cables, connectors, low capacitance probes, high voltage probes, RF demodulator probes, special probes for IC's, current probes.

Unit IV:

Digital Signal Processing (DSP): Introduction to signals, signal processing systems, concept of signal processing, basic elements of digital signal processing (DSP), comparison between DSP and analog signal processing

References:

1. Electronic Instrumentation by H.S. Kalsi
2. Elements of Electronic Instrumentation and Measurement by Joseph J. Carr
3. Instrumentation Devices and Systems by C.S.Rangan, G.S.Sarna and V.S.Man
4. Digital Signal Processingby Oppenheim and Schafer

Paper-XVII (BE-505) Experiments will be performed using 8086

1. To write an assembly language program to transfer a block of data.
2. To write an assembly language program to add two-8 bit Hexadecimal Numbers
3. To write an assembly language program to multiply two 8-Bit Hexadecimal Numbers
4. To write an assembly language program to add two-16 bit Hexadecimal Numbers
5. To write an assembly language program to multiply two 16-Bit Hexadecimal Numbers
6. To write an assembly language program to convert a 16 Bit Hexadecimal Number to Decimal Number
7. To write an language program to Generate Fibonacci series
8. To write an language program to sort hexadecimal numbers in ascending order
9. To write an assembly language program to sort hexadecimal numbers in descending order
10. To study the working of IC 8086 (Interfacing experiment)
11. To study the working of IC 8086 (Interfacing experiment)

Paper-XVIII (BE-506)

1. Study of Amplitude Modulation , Demodulation and measurement of efficiency, percentage modulation index.
2. Study of Frequency Modulation , Demodulation and measurement of efficiency, percentage modulation index.
3. Study of Single Side Band Modulation and Demodulation
4. Study of AM Transmitter and Receiver
5. Study FM Transmitter and Receiver
6. To study the sampling of waveform
7. Study of electric waveforms generated by function generator (Triangular, sinusoidal, square)

Semester VI

Paper XIX (BE-601)

Analog Communications – II

Unit I Demodulation/ Detection, essentials of AM detection, diode detector for AM signals, transistor detector for AM signals, FM detection, Qudrature detector, radio receivers, difference between FM and AM receiver, Discriminator Detector, PAM Demodulators.

Unit II: Transmitters & Receivers

Transmitters: AM transmitter, block diagram and working of Low Level and High Level Transmitters, FM transmitter
Receivers: Block Diagram of Receiver, Receiver parameters: sensitivity, selectivity and fidelity, Super Heterodyne Receiver, Double Conversion Receiver. AM receivers, FM receivers.

Unit III: Transmission line & cable

Transmission line, line constants, phase velocity and line wavelength, characteristics impedence, propagation coefficient, phase and group velocities, standing waves, lossless lines at radio frequencies, voltage standing wave ratio, transmission lines as circuit elements, smith chart

Unit IV: Propagation of Radio waves:

Propagation in free space, tropospheric propagation, Ionospheric propagation, surface wave, low frequency propagation, and very low frequency propagation, extremely low frequency propagation

References:

1. Analog and Digital Communication system by Roden
2. ElectronicCommunication System by Schweber
3. Electronic Communications by Roddy and Coolen

Paper-XX (BE-602): Digital Communication

Unit 1

Pulse Code Modulation: Need for digital transmission, Quantizing, Uniform and Non-uniform Quantization, Quantization Noise, Companding, Coding, Digital Formats. Decoding, Regeneration, Transmission noise and Bit Error Rate. Differential Pulse Code Modulation, Delta Modulation, Quantization noise, Adaptive Delta Modulation. Time Division Multiplexing (TDM), T1/E1 carrier system.

Unit 2

Digital Carrier Modulation Techniques: Block diagram of digital transmission and reception. Information capacity, Bit Rate, Baud Rate and M-ary coding. Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Binary Phase Shift Keying (BPSK) and Quadrature Phase Shift Keying (QPSK).

Unit 3

Multiple Access Techniques: Concept of Frequency Division Multiple Access (FDMA), Code Division Multiple Access (CDMA).

Unit 4

Overview of Modern Communication Systems: Mobile Communication, Satellite Communication and Optical Communication.

Suggested Books:

1. H. Taub and D. Schilling, Principles of Communication Systems, Tata McGraw Hill (1999)
2. W. Tomasi, Electronic Communication Systems: Fundamentals through Advanced, Pearson Education (2004)
3. L. E. Frenzel, Communication Electronics, Principles and Applications, Tata McGraw Hill
4. (2002)
5. L. W. Couch II, Digital and Analog Communication Systems, Pearson Education (2005)
6. H. P. Hsu, Analog and Digital Communications, Tata McGraw Hill (2006)
7. S. Haykin, Communication Systems, Wiley India (2006)

Paper-XXI (BE-603) Advance Electronic Instrumentation

Unit-I

Transducers and its classifications, Criteria for selecting a transducer, Active and passive electrical transducer, Strain Gauge, Gauge Factor, Gauge materials and configuration, displacement transducers, capacitor, inductive, Differential transformers (LVDT), photoelectric and piezoelectric transducers, photo sensitive devices, resistance thermometers, thermistors and thermocouples.

Unit - II

Introduction to Oscilloscopes, Cathode ray tube, vertical and horizontal deflection system, delay lines, oscilloscope probes and transducers, elementary ideas about storage and sampling oscilloscope. Applications of oscilloscope.

Unit - III

Feedback fundamentals, inverse transducers, temperature balance system, self balancing potentiometers, self balancing bridges, beam balance systems, servo operated manometers, Non contact position measurements.

Unit - IV

Data display and recording systems: Data loggers, analog and digital readout systems, Alpha-numeric and CRT readout systems, cathode ray oscilloscope as analog recorder, Magnetic tape recorder, optical and magnetic encoders and decoders, digital I/O devices.

Reference:

1. Transducers and Instrumentation – Murty D V S
2. Modern Electronic Instrumentation and Measurement Techniques – Helfrick A D and Cooper W D
3. Electrical and Electronic Measurements and Instrumentation – Sahney A K
4. Measurement, Instrumentation and Experimental Design in Physics and Enggineering – Sayer and Mansingh

Semester-VI

Paper- XXII- (604): Fiber Optics Communication

Unit I: Fibre Optics: Structure of optical fibres, classification of optical fibres, plastic fibres, light propagation through an optical fibre, acceptance angle and numerical aperture, intermodal dispersion.

Unit II: Fibre losses, calculation of fibre losses, optical fibre cable, splicing and connectors, fusion splices, mechanical splices, connection losses, advantages of optical fibres.

Unit III: Fibre optics communication: Basics of fibre optics, step index fibre, graded index fibre, pulse dispersion in step index fibre, chromatic dispersion and modes of propagation, single mode propagation, losses in fibres, light detectors.

Unit IV: Optoelectronic devices: Introduction of optoelectronic devices, light dependent resistor (LDR), applications of LDR, photo diode, photo transistor, photovoltaic cell or solar cell, light emitting diode (LED), laser diode, applications of optoelectronic devices.

Text Books:

1. Handbook of Electronics: S. L. Gupta and V. Kumar
2. Basic electronics: B. L. Theraja
3. Optical fibre communications by Senior
4. Optoelectronics: An introduction by Wilson and Hawkes

Paper-XXIII (BE-605)

1. To study the Pulse Amplitude Modulation
2. Study of Pulse Width Modulation
3. Study of Pulse Position Modulation
4. Study of Delta Modulation
5. To study Pulse Code Modulation
6. To study the optoelectronic device characteristics
7. To study the phototransistor characteristics
8. To study the I-V characteristics of Solar Cell
9. Characteristics of LEDs and Photodetector.
10. Modulation and Detection of light using LED and Photodetector.
11. To measure the numerical aperture of an optical fiber.
12. Study of optical Fiber as a sensor.

Paper-XXIV : (BE – 606)

Project Work