

**Gujarat University
Ahmedabad**

B. Sc. Semester - I

Electronics : ELE - 101

Unit - I: Components and Instrumentation:

Passive Circuit devices: Resistors, nonlinear resistors, inductors, types of inductors, capacitors, classification of capacitors, different type of capacitors. Switch, types of switches, fuses, circuit breaker, relay, PCB.

Text Book: 1. A text book of electronic circuits R. S. Sedha, S. Chand
Chapter No: 13 (13.1 to 13.48) chapter No: 14 (14.1 to 14.14)

Measuring instruments: DC ammeters, DC voltmeters, Voltmeter sensitivity, series type ohmmeter, shunt type ohmmeter, multimeter, Rectifier type instruments(AC voltmeter) Typical multimeter circuit.

Text Book: Modern Electronics instrumentation and measurement techniques, Helfric and Cooper, PHI 11th Reprint (Art. 4.4 to 4.9, 4.11.2, 4.11.3)

Ref Books: 1. A monograph on Electronics design principle Goyal and Khetan Khanna Publisher
2. Electronics (Solid State) by B. L. Theraja S. Chand & Co.
3. Basic Electronics by Grob
4. Electronic Instrumentation by H. S. Kalsi TMH India

Unit - II: Diodes and their Applications:

Diode Application: Load line analysis of a diode circuit, clipping circuit, positive and negative clipper, biased clipper clipper, some other biased clipper, combination clipper, two level slicer, clamping circuit, biased clampers, practical clamper circuits, application of clamping circuits, voltage multiplier, voltage doublers, voltage tripler and quadrupler.

Special purpose diodes: varactor diode, varactor diode specifications and applications, LED, LED voltage drop and current, LED applications, multicolour LEDs, LCDs, photodiodes, photoconductive cells, photo voltaic cells, LASER diodes and applications.

Text Books: Electronic Devices and Circuits by Allen Mottershead (2.1)
A text book of electronic circuits R. S. Sedha, S. Chand
6.1 to 6.14, 7.12 to 7.14, 7.21 to 7.24, 7.27 to 7.31, 7.33 to 7.35.-7.25

Reference Book: Electronic Devices and Circuit Boylestead and Namensky
Electronic Principles by Malvino and Bates

Unit-III: General amplifier characteristics:

Concept of amplification, amplifier notation, current, voltage and power gain, amplifier input resistance and output resistance, maximum power transfer, conversion efficiency, classes of amplifier, harmonic distortion, three point method of calculating distortion, Measurement of harmonic distortion, other type of amplifier distortion

Decibels, other equation for decibel computation, zero decibel reference level, use of a voltmeter as a decibel indicator, voltmeter range correction factor, frequency response, amplifier band width, phase relationship in amplifier, square wave testing

Text Book: Electronics devices and circuit – Allen Mottershead, PHI
Article Nos: 7.1 to 7.12, 7.15, 7.16. 8.1 to 8.8 and 8.11

Unit-IV: Digital Electronics:

Binary number system, binary to decimal conversion, decimal to binary conversion, octal numbers, hexadecimal numbers, the ASCII codes, the excess-3 codes, the gray code, binary addition, binary subtraction, unsigned binary numbers, sign magnitude numbers, 2's complement representation, 2's complement arithmetic. Boolean laws and theorems.

Text Book: Digital Principles and applications 6th Edition Malvino Leach and Saha
Article Nos: 5.1 to 5.8., 6.1 to 6.6., 3.1
Reference Books: Digital Fundamentals by Floyd , Pearson
Digital Design Morris and Mano, PHI

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B. Sc. Semester - II

Electronics : ELE - 103

Unit-I: Transistors:

Bipolar Junction transistor, operation of PNP and NPN transistor, current components in transistor, transistor as an amplifier, transistor circuit configuration, CB, CE, and CC configuration, characteristic of common base and common emitter circuit, DC load line.

Transistor Biasing: Stabilization, stability factor, different method for transistor biasing, base resistor method, collector to base bias, base bias with collector emitter feedback, voltage divider bias, bias compensation.

Text Book: Electronic Devices and Circuits by Sanjeev Gupta (6.1 to 6.12, 10.1 to 10.9)

Reference Book: Electronic Devices and Circuits by Allen Mottershead

Basic Electronics and Linear Circuits by Bhargav, kulshrestha and Gupta, TMH

Millman's Integrated Electronics Millman Halkias and Parikh

Unit-II: Four Terminal Active Network:

Transistor as a four pole, Impedance parameters or Z- parameters, Admittance parameters or Y-parameters, Hybrid parameters or h-parameters, Performance of a linear circuit in h-parameters, Voltage gain current gain and output impedance taking into account the source resistance (R_s).

Small signal amplifiers: practical circuit of transistor amplifier, load line analysis, calculation of gain, phase reversal, Simplified CE hybrid model, generalized approximate model, classification of amplifiers, common emitter CE amplifier, Analysis of transistor amplifier using h-parameters, (common base CB amplifier and common collector CC amplifier without h-parameter analysis), comparison of CE, CB, and CC amplifiers.

Text Book: Electronic Devices and Circuits by Sanjeev Gupta (9.1 to 9.6., 11.1 to 11.4., 11.6 to 11.13)

Reference Books: Electronic Devices and Circuits by Allen Mottershead

Basic Electronics and Linear Circuits by Bhargav, kulshrestha and Gupta, TMH

Millman's Integrated Electronics Millman Halkias and Parikh

Unit-III: Network transformations:

Reduction of complicated network, conversion between T and π sections, bridge T network, the lattice network, superposition theorem, the reciprocity theorem, thevenin's theorem, Norton theorem, maximum power transfer theorem, compensation theorem.

Resonance : Definition of Q, the figure of merit, series resonance, Bandwidth of the series resonant circuit, parallel resonance or antiresonance, current in antiresonant circuits, Bandwidth of antiresonant circuits.

Text Book: Network Lines and Field by J D Ryder. (1.4 to 1.13, 2.1 to 2.4, 2.6, 2.8)

Reference Books: Network Analysis by M. S. Van Valkenburg

Network Analysis by G K Mithal

Unit-IV: Digital Electronics:

Combinational logic Circuits: sum of products method, truth table of karnaugh map, pairs, quads and octets, karnaugh simplifications, Don't care conditions, product of sums method, product of sums simplification, Simplification by quine-McClusky method.

Data processing circuits: Multiplexers, demultiplexers, 1-of-16 decoder, BCD-to-decimal decoders, seven segment decoders, encoders, exclusive-or GATES, parity generators and checkers, read only memory.

Text Book: Digital Principles and applications 6th Edition Malvino Leach and Saha
(3.2 to 3.9, 4.1 to 4.8, 4.10)

Reference Books: Digital Fundamentals by Floyd , Pearson
Digital Design Morrisand Mano PHI

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B. Sc. Semester - II

Electronics Practicals : ELE – 104

Group-I:

The practical of common base characteristics is to be replaced by Study of maximum power transfer theorem.

Group-II:

The practical BCD to binary and binary to BCD code conversion is to be replaced by Study of truth tables of 2,3 and 4 input Ex-OR gate and its uses as parity checker and controlled inverter.

All other experiments remain as it is.
In each group there are seven experiments.