

Contact hours/week:	Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits:	5
Course Assessment methods:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and One Minor test and One Major Theory & Practical Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, LED, BJT, JFET and MOSFET etc.
2. Able to understand the working principles of electronic circuits e.g., Rectifiers, Clipper, Clamper, Filters, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits
3. Able to understand the functioning and purposes of Power Supplies, Test and Measuring equipment's such as multimeters, CROs and function generators etc.
4. Able to rig up and test small electronics circuits.

Topics Covered

UNIT-I

9L

Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, concept of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptors impurities, Junction diode, p-n junction, depletion layer, v-i characteristics, diode resistance, capacitance, diode ratings (average current, repetitive peak current, non-repetitive current, peak inverse voltage). Diode Applications in rectifier, filters, voltage multipliers, load regulators, clipper and clamper circuits, Breakdown mechanism (Zener and avalanche), breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator

UNIT-II

9L

Bipolar Junction Transistor (BJT): Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors-fixed bias, emitter bias, potential divider bias, comparison of biasing circuits. Transistor Amplifier: Graphical analysis of CE amplifier, concept of voltage gain, current gain, h- parameter model (low frequency), computation of A_i , A_v , R_i , R_o of single transistor CE and CC amplifier configurations.

UNIT-III

9L

MOSFET: depletion and enhancement type MOSFET-construction, operation and characteristics. Computation of A_v , R_i , R_o , of single FET amplifiers using all the three configurations.

Operational Amplifiers: Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators equation CG, CS and CD configurations, fixed & self-biasing.

UNIT-IV

9L

Switching theory and logic design: Number systems, conversion of bases, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map
Operational Amplifiers

Electronics Instruments: Working principle of digital voltmeter, digital multimeter (block diagram approach), CRO (its working with block diagram), measurement of voltage, current, phase and frequency using CRO

EXPERIMENTS

A. Compulsory Experiments

1. To identify the components which are used in electronic circuits.
2. To get familiarization and to study the operation of a function generator instrument and visualize the types of waveforms produced by a function generator.
3. To study the CRO and to find the Amplitude and Frequency of a sinusoidal waveform using CRO.
4. To plot and analyze the forward and Reverse Characteristics of Si based P-N junction diode.
5. To implement a circuit to study the various applications of Operational Amplifier.
6. Study of half wave rectifier.
7. Operation of diode-based clipper and clamper circuits.

B. Optional Experiments

1. Implement a circuit to draw the characteristics of JFET in common source configuration.
2. Implement a circuit of half wave and full wave rectifiers with filters.
3. Implement a circuit to draw the characteristics of common emitter BJT amplifier.

Books & References

1. Electronic Devices and Circuits-Boylestad and Nashelsky, 6e, PHI, 2001.
2. Electronic Devices and Circuits, A Mottershead, PHI, 2000, 6e.
3. Digital Computer Design, Morris Mano, PHI, 2003.