II Year II Semester	**L**	**T**	**P**	**C**
Code:20IO4707	**3**	**0**	**0**	**3**

ELECTRONIC DEVICES (Minors)

Course Objectives:

1. To learn and understand the basic concepts of semiconductor physics and working of a Diode with its applications.
2. To study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
3. To acquire knowledge about the principle, working and operation of Bipolar Junction Transistor and purpose of its biasing techniques.
4. To acquire knowledge about the principle, working and operation of FETs and purpose of its biasing techniques.
5. To understand the working, analysis and design of transistor amplifier circuits at low frequencies

Course Outcomes:

A student who successfully fulfils this course requirement will be having:

1. An ability to apply the basic concepts of semiconductor and to understand the formation and characteristics of PN Junction Diode with relevant applications
2. An ability to understand the Construction, Operation, Characteristics and applications of special diodes
3. An ability to illustrate the construction, principle of operation, Characteristics of BJT with its biasing techniques.
4. An ability to know the Construction, Characteristics of FET & MOSFET with their biasing techniques
5. An ability to perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

UNIT–I

Semiconductor Basics & PN Junction Diode

Atomic Structure, Semiconductors, conductors and Insulators, Covalent Bonds, Conduction in Semiconductors, N-Type and P-Type Semiconductors, The diode, Biasing a diode, Voltage-Current Characteristic of a diode, Diode Models, Testing a diode, Diode Applications – Half-Wave Rectifiers, Full-Wave Rectifiers, Power supply filters and regulators

UNIT–II

Special Diodes

Breakdown Mechanisms – Zener Breakdown and Avalanche Breakdown, Zener Diode V-I Characteristics, Zener diode as voltage regulator. Construction, Operation, Characteristics and applications of Varactor Diode, LED, SCR, The Schottky diode, The PIN diode, The Tunnel Diode, The Laser Diode, LCD

UNIT–III

Bipolar Junction Transistors

Transistor Structure, Basic Transistor Operation, Transistor Characteristics and parameters, The

Transistor as an Amplifier, The Transistor as a switch, Transistor Packages and Terminal Identification, BJT Bias Circuits – The DC operating point, Voltage divider Bias, Base Bias, Emitter Bias, Collector-Feedback Bias

UNIT–IV

Field Effect Transistors

The JFET, JFET Characteristics and Parameters, JFET Biasing – Self Bias, Voltage divider Bias. The MOSFET – Depletion MOSFET, Enhancement MOSFET. MOSFET Characteristics and Parameters, MOSFET Biasing – D-MOSFET Bias, E-MOSFET Bias.

UNIT–V

Transistor Amplifier circuits

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, comparison of transistor amplifiers. **FET:** Generalized analysis of small signal model of FET, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1. Electronic Devices – Thomas L. Floyd, Pearson Education, Seventh Edition, 2005.
2. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, McGraw Hill, Third Edition, 2010.

Reference Books:

1. Electronics Devices & Circuit Theory – Robert L.Boylestad and Louis Nashelsky, Prentice Hall, Tenth Edition, 2009.
2. Electronic Devices and Circuits – J. Millman and C. Halkias, Tata McGraw Hill, Second Edition, 2007.