B.Tech II Year I Semester
ELECTRONIC DEVICES AND CIRCUITS

Course Code: 21EC302PC **L/T/P/C: 3/0/0/3**

Course Objectives:

- To understand the components and its functionality such as Diodes, BJTs and FETs.
- To know the switching characteristics of components
- To classify and compare the functionalities of diodes, BJTs and FETs To know the applications of components.
- To understand the various types of circuits used in Engineering Field.

Course Outcomes: Upon completing this course, the student will be able to

- Describe about different types of diodes, transistors and applying them for understanding various circuits.
- Know the characteristics of various components.
- Analyze the working principles of various components.
- Ability to express functioning of diodes, BJT's, UJT's, FET's and SCR's.
- Analyze and design various circuits for different applications in Engineering Field.

UNIT – I

Diode and Applications: Review of PN Junction diode, Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, and Types of Clampers. **Special Purpose Devices:** Zener Diode - Characteristics, Voltage Regulator. Varactor Diode Principle of Operation -SCR, Tunnel diode, UJT, .

UNIT - II

Bipolar Junction Transistor (BJT): Review of BJT, Transistor Biasing and Stabilization - DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diodes.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Determination of h-parameters from transistor characteristics, Typical values of h- parameters in CE, CB and CC configurations, Analysis of CE, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers and introduction to large signal amplifiers.

UNIT - III

Junction Field Effect Transistor (FET): Construction, Principle of Operation, Comparison of BJT and FET, FET as Voltage Variable Resistor.

FET Amplifiers: Small Signal Model, Analysis of JFET Amplifiers, Analysis of CS, CG MOSFET Characteristics in Enhancement and Depletion mode, Basic Concepts of MOS

UNIT – IV

Multistage Amplifiers & Tuned Amplifiers: Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage amplifiers, Cascaded RC Coupled amplifiers, Darlington pair.

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response of tuned Amplifiers, Concept of stagger tuning and synchronous tuning.

UNIT – V

Feedback Amplifiers: Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Type of feedback amplifier

Oscillators: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

TEXT BOOKS:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.
2. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, Pearson.
3. Electronic Devices and Circuits – S.Salivahanan Tata Mc Graw Hill,2011

REFERENCE BOOKS:

1. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson
3. Electronic Devices and Circuits K.Lal Kishore, B.S Publications 2008.