# ELECTRONIC DEVICES AND CIRCUITS

**Course Code: 15EC1101**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

## Course Outcomes:

Upon completion of the course, students will able to:

**CO 1** Identify different materials used for an electronic device & describe the characteristics of various diodes and Design power supplies using Rectifiers and Filters.

**CO 2** Analyze the characteristics of BJT, JFET, MOSFET, and UJT.

**CO 3** Illustrate various biasing Techniques for a transistor and perform DC Analysis.

**CO 4** Perform AC Analysis of a BJT using small signal model.

**CO 5** Identify the different feedback amplifiers and design various low and high frequency oscillators.

## UNIT-I (12 Lectures)

### DIODE CHARACTERISTICS:

Introduction to semiconductor materials, V-I Characteristics of Diode, Zener Diode Characteristics, Zener Diode as Voltage Regulator, Tunnel diode, LED.

### RECTIFIERS AND FILTERS:

Half wave rectifier, Full wave rectifier, Advantages of full wave rectifier over Half Wave rectifier, C- Filter, Inductor filter, LC- Filter, Pi- filter.

## UNIT-II 10 Lectures)

### TRANSISTOR CHARACTERISTICS:

Bipolar junction transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between current

gain parameters (alpha, beta and gamma), Characteristics of JFET, MOSFET (enhancement and depletion), Characteristics of UJT and SCR.

## UNIT-III (08 Lectures)

### BIASING AND STABILITY:

Need for biasing, criteria for fixing the operating point, thermal run away, thermal stability, stabilization techniques.

## UNIT-IV (08 Lectures)

### SMALL SIGNAL AMPLIFIERS:

h-parameter representation of a Transistor, Analysis of single stage transistor amplifier using h-parameters, comparison of transistor configurations in terms of $A_v$ , $A_i$ , $R_i$ ,$R_o$.

## UNIT-V (12 Lectures)

### FEEDBACK AMPLIFIERS:

Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output Resistances.

### OSCILLATORS:

Condition for oscillations, RC Phase shift oscillator with Transistor, Wein bridge oscillator, Hartley and Colpitts oscillator.

## TEXT BOOKS:

1. Millman Jacob Halkias C Christos, *"Electronic Devices and Circuits"*, 2nd Edition, Tata McGraw-Hill Publications, 2007.

## REFERENCES:

1. Boylestad. Robert, *"Electronic Devices and Circuits Theory"*, 10th Edition, PHI Publications, 2008.
2. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu. *"Electronic Devices and Circuits"*, 2nd Edition, Pearson Publications, 2009.

3. Raju GSN *"Electronic Devices and Circuits"*, 1st Edition, IK International Publishing House, 2006.
4. Lal Kishore *"Electronic Devices & Circuits"*, 2nd Edition, BSP Publications, 2005.