

## ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, CSE, IT)

**Course Code: 13EC1142**

**L T P C**

**4 1 0 3**

### Pre requisites:

Basic Electrical Engineering, Network Analysis, Engineering Physics, and Basics of Mathematics

### Course Educational Objectives:

- ❖ To study the principles of electronics Engineering
- ❖ To study the operation and characteristics of different semiconductor devices.
- ❖ To study the basic design concepts of low frequency amplifiers & oscillators circuits using various transmissions for different applications.

### Course Outcomes:

Upon completion of the course, students will:

- ❖ State the operating principles of major electronic devices, circuit models and connection to the physical operation of device
- ❖ Be able to apply this knowledge to the analysis and design of basic circuits

### UNIT-I

(14 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,  $\delta$ - filter.

**UNIT-II****(12 Lectures)****TRANSISTOR CHARACTERISTICS:**

Bipolar junction transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between  $\alpha, \beta, \tilde{\alpha}, \tilde{\beta}$ . Characteristics of JFET, MOSFET (Enhancement and depletion), Characteristics of UJT .

**UNIT-III****(10 Lectures)****BIASING AND STABILITY:**

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

**UNIT-IV****(10 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****(14 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*”, 2<sup>nd</sup> Edition, Tata Mcgrawhill Publications, 2007.
2. Boylestad.Robert “*Electronic Devices and Circuits Theory*”, PHI Publications, 10<sup>th</sup> Edition, 2008.

**REFERENCES:**

1. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu. “*Electronic Devices and Circuits*”, Pearson Publications, 2<sup>nd</sup> Edition, 2009.
2. Raju GSN, “*Electronic Devices Electronic Devices And Circuits*”, IK International Publishing House, 1<sup>st</sup> Edition, 2006.
3. Lal Kishore “*Electronic Devices & Circuits*”, BSP Publications, 2<sup>nd</sup> Edition, 2005.

