ELECTRONIC DEVICES AND CIRCUITS

Course Code: 15EC1101

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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.