ECE249:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L:3 T:1 P:0 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: Understand the fundamental behavior of circuit elements and DC networks.

CO2 :: Learn the fundamental behavior and notations of AC circuits.

CO3 :: Discuss the working principles and applications of transformers.

CO4 :: Analyze the working of various semiconductor devices and its applications.

CO5 :: Distinguish between combinational and sequential logic system.

CO6 :: Explore the functionality of digital circuits under real and simulated environment.

Unit I

Fundamentals of D.C. circuits : resistance, inductance, capacitance, voltage, current, power and energy concepts, ohm's law, Kirchhoff's laws, voltage division rule, current division rule, star–delta transformation, mesh and nodal analysis, dependent and independent sources, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem

Unit II

Fundamentals of A.C. circuits : alternating current and voltage, definitions of amplitude and phase, average and RMS value of an AC signal, RL, RC and RLC circuits, power calculation in RL, RC and RLC circuits, Transformer- working, principle, and turn ratio, Instrument transformers, Auto-transformer

Unit III

Fundamental of semiconductor devices : PN junction diode and its applications, Bipolar junction transistor (PNP and NPN), MOSFET (working and applications), Op-amp (features and virtual ground concept), Op-amp (inverting and non-inverting)

Unit IV

Introduction to number system and logic gates : Number system (conversion and codes), logic gates, CMOS logic gates, boolean algebra, SOP and POS, K- Map (up to 4 variables)

Unit V

Introduction to Combinational Logic Circuits : Adders, Subtractors, Comparators, Multiplexers and De-multiplexers, multiplexer design, Decoders, Encoders

Unit VI

Introduction to Sequential Logic Circuits : Basic sequential circuits: SR-latch, D-latch, D flip-flop, JK flip- flop, T flip-flop, Master Slave JK flip flop, Conversion of basic flip-flop, Registers: Operation of all basic Shift Registers, Counters: Design of Asynchronous, Synchronous counters, Ring counter and Johnson ring counter

Text Books:

1. FUNDAMENTALS OF ELECTRICAL ENGINEERING AND ELECTRONICS by B.L.THERAJA, S. CHAND & COMPANY

References:

1. BASIC ELECTRICAL ENGINEERING BY D.C. KULSHRESTHA, MC GRAW HILL by D.C. KULSHRESTHA, MC GRAW HILL

2. . DIGITAL FUNDAMENTALS BY THOMAS L. FLOYD , R. P JAIN, PEARSON by THOMAS L. FLOYD , R. P JAIN, PEARSON

3. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MCGRAW HILL EDUCATION