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 and AC networks.

CO2 :: analyze the working of various semiconductor devices and their applications

CO3 :: explore the basics of digital electronics

CO4 :: develop the knowledge to integrate the sensors and boards

CO5 :: employ the functionality of digital circuits under real and simulated environments.

CO6 :: distinguish between combinational and sequential circuits

Unit I

Fundamentals of DC and AC circuits : resistance, inductance, capacitance, voltage, current, power and energy concepts, ohm's law, Kirchhoff's laws, voltage division rule, current division rule, mesh and nodal analysis, dependent and independent sources, Thevenin's theorem Norton's theorem, alternating current and voltage, definitions of amplitude and phase, average and RMS value of an AC signal

Unit II

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

Unit III

Introduction to number system and logic gates : boolean algebra, SOP and POS, K- Map (up to 4 variables), logic gates, Number system (conversion) and codes (B-G,G-B,Excess-3,BCD)

Unit IV

Introduction of Arduino and Sensors : Arduino board (pin configuration and description), basic principle of ultrasonic sensor, Temperature, IR sensor.

Unit V

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

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. BASIC ELECTRICAL AND ELECTRONICS ENGINEERING by D.P. KOTHARI, I J. NAGRATH, MCGRAW HILL EDUCATION

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

4. INTERNET OF THINGS (IOT)- ARCHITECTURE AND DESIGN PRINCIPLES by RAJ KAMAL, MCGRAW HILL EDUCATION

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