ECE216:DIGITAL ELECTRONICS LABORATORY

L:0 T:0 P:2 Credits:1

Course Outcomes: Through this course students should be able to

- Describe the design and functionality of digital circuits.
- Analyze the digital circuits and compare its theoretical performace to actual performance.
- Analyze functionality of the digital trainer kit to verify basic logic truth table.

List of Practicals / Experiments:

Analysis and Synthesis of Boolean Expressions using Basic Logic Gates

- Understanding the combinational logic by implementing the boolean function using basic logic gates

Analysis and Synthesis of Arithmetic Expressions using Adders/Subtractors

- To design and analyze the circuit for Full adder and Full subtractor using Logic Gates.

Analysis and Synthesis of Logic Functions using Multiplexers and decoders

- Understanding the combinational logic byimplementing the boolean function usingmultiplexer
- Understanding the combinational logic byimplementing the boolean function usingDecoder

Analysis and Synthesis of Sequential Circuits using Flip-Flops

- Understanding the sequentianal logic byimplementing the flip flop with the helpof logic gates
- Understanding the sequentianal logic byimplementing the counter with flip flop.

Analysis of Functions of BCD-TO-7-segment Decoder / Driver and Operation of 7-segment LED Display

- To visualize the output of decade counter on seven segment display

Design and implementation of combinational and sequential circuit using Software

- To implement and simulate combinational and sequential circuit using DSCH/Proteus.

Design and Implementation of application based projects, any two to be implemented

- To design a line following robot using basic gates.
- To design 4 bit digital calculator which can perform addition and multiplication and display using 7 segment.
- To design a circuit which can generate random number and display using 7 segment.
- To design a circuit for humidity and temperature monitoring.
- To design a circuit for secure locking mechanism.
- To design a system for solar tracking.
- To design a up and down fading lights (different colored LEDs) with specified delays usingflipflops/counters
- Design a universal counter which can perform different shift operations using multiplexer.
- Design a digital calculator which can implement subtraction and division functions, and display output in 7-segment display unit

Text Books:

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

References:

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

2. DIGITAL DESIGN PRINCIPLES AND PRACTICES by JOHN F. WAKERLY, PEARSON

3. DIGITAL ELECTRONICS PRINCIPLES AND INTEGRATED CIRCUITS by ANIL K MAINI, PEARSON