

ECE216: DIGITAL ELECTRONICS LABORATORY

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

Course Outcomes: Through this course students should be able to

CO1 :: describe the design and functionality of digital circuits.

CO2 :: illustrate the digital circuits and compare its theoretical performance to actual performance.

CO3 :: analyze functionality of the digital trainer kit to verify basic logic truth table.

CO4 :: evaluate the performance of complex digital circuits on Proteus/DSCH

CO5 :: develop and implement basic knowledge gained in digital electronics in the form of application based projects

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 by implementing the boolean function using multiplexer
- Understanding the combinational logic by implementing the boolean function using Decoder

Analysis and Synthesis of Sequential Circuits using Flip-Flops

- Understanding the sequential logic by implementing the flip flop with the help of logic gates
- Understanding the sequential logic by implementing 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 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 smart home automation.
- To design a circuit for secure locking mechanism.
- To design a circuit for global positioning system synchronize clock.
- To design a system for solar tracking.
- To design a up and down fading lights (different colored LEDs) with specified delays using flipflops/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

References:

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

References:

2. DIGITAL ELECTRONICS PRINCIPLES AND INTEGRATED CIRCUITS by ANIL K MAINI, WILEY
3. DIGITAL DESIGN PRINCIPLES AND PRACTICES by JOHN F. WAKERLY, PEARSON
4. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MCGRAW HILL EDUCATION
5. DIGITAL DESIGN PRINCIPLES AND PRACTICES by JOHN F. WAKERLY, PEARSON
6. DIGITAL FUNDAMENTALS by THOMAS L. FLOYD , R. P JAIN, PEARSON
7. DIGITAL ELECTRONICS PRINCIPLES AND INTEGRATED CIRCUITS by ANIL K MAINI, PEARSON
8. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MCGRAW HILL EDUCATION
9. DIGITAL ELECTRONICS- A COMPREHENSIVE LAB MANUAL by CHERRY BHARGAVA, BS PUBLICATIONS