

ECE216: DIGITAL ELECTRONICS LABORATORY

Course Outcomes: Through this course students should be able to

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

CO2 :: Analyze 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.

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

Text Books: 1. DIGITAL DESIGN PRINCIPLES AND PRACTICES by JOHN F. WAKERLY, PEARSON

References: 1. DIGITAL FUNDAMENTALS by THOMAS L. FLOYD , R. P JAIN, PEARSON
2. DIGITAL ELECTRONICS PRINCIPLES AND INTEGRATED CIRCUITS by ANIL K MAINI, PEARSON
3. DIGITAL INTEGRATED ELECTRONICS by H. TAUB AND D. SCHILLING, MCGRAW HILL EDUCATION
4. DIGITAL ELECTRONICS- A COMPREHENSIVE LAB MANUAL by CHERRY BHARGAVA, BS PUBLICATIONS