II B.Tech - I Semester (20EC3102) DIGITAL ELECTRONICS LAB

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3

С

1.5

Int. Marks Ext. Marks Total Marks

15 35 50

Pre-Requisites: None

Course Objectives:

- Learn the basics of logic gates, SOP and design and verify simple Combinational logic circuits
- Study, design and verification of higher level combinational logic circuits
- Understand the concepts of flip-flops and design and verify shift register and counters
- **Note:** The students are required to design the circuit and perform the simulation using Circuit Lab / Equivalent Industrial Standard Licensed simulation software tool. Further they are required to verify the result using necessary hardware equipment.

List of Experiments: (Minimum of Twelve Experiments has to be performed)

- 1. Verification of truth tables of Logic gates
 - a. Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive OR (vi) Exclusive NOR
- 2. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit
- 3. Verification of functional table of 3x8 line Decoder /De-multiplexer
- 4. Four variable logic function verification using 8x1multiplexer.
- 5. Design full adder circuit and verify its function table.
- 6. Draw the circuit diagram of a two-bit comparator and test the output
- 7. Construct 7-Segment Display Circuit Using Decoder and test it.
- 8. Design BCD Adder Circuit and Test the Same using Relevant IC
- 9. Design Excess-3 to BCD convertor using only four Full Adders and test the Circuit.
- 10. Verification of functional tables of
 - a. D Flip -Flop
 - b. T Flip -Flop
 - c. JK Edge triggered Flip-Flop
- 11. Design a four-bit ring counter using D Flip Flops / JK Flip Flop and verify output
- 12. Design a four-bit Johnson's counter using D Flip-Flops / JK Flip Flops and verify output
- 13. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
- 14. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip- Flops and Test it with a low frequency clock and Sketch the output waveforms.
- 15. Design MOD-8 synchronous counter using T Flip-Flops and verify the result and sketch the output waveforms.

Equipment required:

Software:

- 1. Circuit Lab / Equivalent Industrial Standard Licensed simulation software tool.
- 2. Computer Systems with required specifications

Apparatus required:

- 1. Trainer kit with inbuilt DC Supply, output LED's, input pulse signals, bread board.
- 2. Respective IC's.
- 3. Connecting wires.

Course Outcomes:

After successful completion of the course, the students can be able to:

S. No	Course Outcome	BTL
1	Knowledge on basic logic gates, design and verify combinational logic circuits	L5
2	Design and verify simple combinational logic circuits	L5
3	Construct and implement higher level combinational logic circuits	L5
4	Understand the concepts of various flip-flops and design counters	L5
5	Construct and verify various counters with given specifications	L5

Correlation of COs with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	1	-	1	-	-	-	3	-	-	-	1	3
CO 2	3	3	2	-	3	-	-	-	3	-	-	-	2	3
CO 3	3	2	2	-	3	-	-	-	3	-	-	-	2	3
CO 4	3	-	2	-	3	-	-	-	3	-	-	-	1	3
CO 5	3	1	2	1	3	-	-	-	3	-	-	-	2	3