

Program : Diploma in Electronics/ Electronics and Communication Engineering/ Biomedical Engineering	
Course Code : 3048	Course Title: Digital Electronics Lab
Semester : 3	Credits: 1.5
Course Category: Program Core	
Periods per week: 3 (L:0, T:0, P:0)	Periods per semester: 45

Course Objectives:

- To complement and reinforce the theoretical knowledge in Digital Electronics.
- To implement simple digital circuit based applications.

Course Prerequisites:

Topic	Course code	Course name	Semester
Experiments with electric circuits and electronic components		Fundamentals of Electric & Electronics Engineering Lab	2
Combinational & Sequential circuits		Digital Electronics	3

Course Outcomes:

On completion of the course, the student will be able to:

CO _n	Description	Duration (Hours)	Cognitive level
CO1	Develop basic logic functions using TTL logic gates	6	Applying
CO2	Construct combinational logic circuits using logic gates	12	Applying
CO3	Construct flip flops and shift registers using gates and ICs	9	Applying
CO4	Construct synchronous and asynchronous counters using Flip Flop ICs.	15	Applying
	Lab Exam	3	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						
CO4	3	3	3				

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	Develop basic logic functions using TTL logic gates		
M1.01	Verify the truth tables of logic gates – NOT OR AND NAND NOR XOR XNOR.	3	Understanding
M1.02	Develop any logic function using NAND and NOR gates only.	3	Applying
CO2	Construct Combinational logic circuits using logic gates		
M2.01	Construct Half Adder and Full Adder using logic gates	3	Applying
M2.02	Construct Binary to Gray and Gray to Binary code converters	3	Applying
M2.03	Construct 4 to 1 Multiplexer and 1 to 4 De-Multiplexer using Logic gates.	3	Applying
M2.04	Demonstrate the use of MUX IC 74151, Decoder/Demux IC 74155.	3	Understanding
	Lab Exam	1.5	
CO3	Construct Flip Flops and Shift Registers using gates and ICs		
M3.01	Construct SR flip flop using NAND gates and convert it into D flip flop.	3	Applying
M3.02	Demonstrate the use of D Flip Flop IC 7474, JK Flip Flop IC 7476	3	Understanding
M3.03	Construct controlled shift registers (left/right with mode control)	3	Applying
CO4	Construct Synchronous and Asynchronous Counters using Flip Flop ICs.		
M4.01	Construct Asynchronous Decade Counter (0-9) with 7 segment display	3	Applying

M4.02	Demonstrate the use of Decade(BCD) counter IC 7490, Counter IC 7493	3	Understanding
M4.03	Construct Synchronous Up-Down Counter with a 7 segment display.	3	Applying
M4.04	Construct Johnson counter using Flip Flops	3	Applying
M4.05	Construct Ring counter using Flip Flops	3	Applying
	Lab Exam	1.5	

Text /Reference:

T/R	Book Title/Author
T1	Digital principles & Applications Albert Paul Malvino& Donald P. LeachMcGraw Hill Education; Eighth editionISBN: 978-9339203405
R2	Digital Electronics, Roger L. TokheimMacmillian, McGraw-Hill Education (ISE Editions);International 2 Revised edition ISBN: 978-0071167963 Macmillian
R3	Digital Electronics—an introduction to theory and practice, William H. Gothmann, Prentice Hall India Learning PrivateLimited; 2 editionISBN: 978-8120303485
R4	Fundamentals of LogicDesign, Charles H. Roth Jr. Jaico Publishing House; First editionISBN: 978-8172247744
R5	Digital Electronics, R. Anand, Khanna Publications, New Delhi (Edition 2018) ISBN: 978-93-82609445

OnlineResources:

Sl.No	Website Link
1	https://en.wikibooks.org/wiki/Digital_Electronics
2	https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/
3	https://www.allaboutcircuits.com/textbook/digital/
4	https://www.researchgate.net/publication/264005171_Digital_Electronics

** - Suggested Open Ended Projects

(Not for End Semester Examination but compulsory to be included in Continuous Internal valuation. Students can do open ended experiments as a group of 2-3. Open ended experiments should include the concepts of

- 1) Simplify a given expression using K map and implement using logic gates.
- 2) Design a counter with given specifications.