

Subject Code: 1ET1100202	Subject Title: Introduction to Digital Electronics
Pre-requisite	Basic Electronics

Course Objective: The students need to learn basic concepts like number systems, digital circuits and concepts which helps to design complex digital system such as microprocessors. Students learn combinational and sequential circuits using digital logic fundamentals. This is the course by which students get exposure to digital integrated circuits in the world.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	1	2	5	70	30	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Number System: Digital computer and digital systems, Binary Number, Number base conversion Octal and Hexadecimal Number, complements, Binary Codes, Binary Storage and register	4	10	
2	Boolean Algebra and Logic Gates : Basic Definition, Axiomatic Definition of Boolean Algebra, Basic Theorem and Properties of Boolean Algebra, Minterms And Maxterms, Logic Operations, Digital Logic Gates, IC digital Logic Families	5	15	
3	Simplification of Boolean Functions: Different types Map method, Product of sum Simplification, NAND or NOR implementation, Don't Care condition, Tabulation method	6	15	
4	Combinational Logic: Introduction, Design Procedure, Adder, Subtractor, Code Conversion, Universal Gate, Binary Parallel Adder, Decimal Adder, Magnitude Comparator	7	20	
5	Sequential Logic: Introduction, Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment	7	20	
6	Registers, Counters and the Memory unit : Introduction, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, Memory Unit, Digital integrated circuits-TTL,ECL, MOS,CMOS	8	20	

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Solve the given problem using fundamentals of Number systems and Boolean algebra.	3 Applying
CLO2	Analyze working of logic families and logic gates and design the simple circuits using various gates for a given problem.	5,3,4 Evaluate, Applying, Analyze
CLO3	Design and implement Combinational and Sequential logic circuits and verify its working.	3,4 Applying, Analyze

CLO4	Examine the process of Analog to Digital conversion and Digital to Analog conversion and exposure of digital integrated circuits.	4 Analyze
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Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	M	L	L	L	L	L	L	L	L	L	L	L	L	H	M
CLO2	L	H	H	M	L	L	L	L	L	L	L	L	H	M	M	H
CLO3	M	H	H	L	L	L	L	L	L	L	L	L	H	L	L	L
CLO4	M	H	M	H	L	L	L	L	L	L	L	L	L	L	L	L

H: High, M: Medium, L: Low

List of Book References:

1. "Digital logic and Computer design", M. M. Mano, Pearson Education India, 2016.
2. "Fundamentals of Digital Circuits", A. Kumar, Prentice Hall India, 2016.
3. "Digital Principles and Applications" Malvino & Leach, McGraw-Hill Education
4. "Modern Digital Electronics", R. P. Jain, McGraw Hill Education, 2009.

E-Resources / Web Links:

1. https://www.tutorialspoint.com/digital_circuits/digital_circuits_useful_resources.htm
2. <https://de-iitr.vlabs.ac.in/List%20of%20experiments.html>
3. <https://dld-iitb.vlabs.ac.in/List%20of%20experiments.html>

List of Experiments:

1. To study and verify performance of various Logic Gates.
2. To study and perform De-Morgan's Theorem.
3. To perform NAND and NOR as Universal Gates.
4. Design and analyze Half Adder and Full Adder.
5. Design and analyze Half Subtractor and Full Subtractor.
6. Design and analyze Multiplexers.
7. Design and analyze Decoder and De-Multiplexer.
8. Design and analyze Encoder.
9. To study and perform 4 bit Magnitude Comparator.
10. To verify performance of RS and D Flip Flops.
11. To verify performance of JK and T Flip Flops.
12. To study and perform Decade Counter.