Faculty of Engineering and Technology

Bachelor of Technology (Semester III/ Second Year)
In Effect from Academic Year 2023-24

Branch Name:	Computer Engineering / Information and Communication Technology / Artificial Intelligence and Data Science
Program Code:	ET103 / ET107 / ET108
Course Title:	Digital Electronics
Course Code:	2ET1030301T
Pre-requisite Course:	Basic Electronics and Number Systems

Course Objectives:

This course will enable students:

1. The students need to know combinational and sequential circuits using digital logic fundamentals.
2. The students need to know (combinational/sequential devices), memory design, terminology of digital IC circuits etc.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
					SEE		CCA		SEE		CCA		
	L	T	P	Total	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Course Contents:

Unit No	Topics	Total Hours	Weightage (%)
1	**Fundamentals of Logic gates:** Number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements Arithmetic, Code Conversion, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Universal gate.	06	25
2	**Fundamentals of Boolean Algebra:** Boolean algebra and logic diagram, Laws and Rules, DeMorgan's Theorem, Boolean Expression and Truth Tables, K-map representation, and simplification of logic functions using K-map, minimization of logical functions, Don't care conditions, Tabulation Method, Product of Sum Simplification, Minterms And Maxterms.	09	20
3	**Combinational Logic Circuits**: Adders, Subtractors, Multiplexer, De-Multiplexer, Digital comparator, parity checker/generator, code converters, Encoders, Decoders, Magnitude Comparator.	07	20
4	**Sequential Digital Circuits:** SR flip flop, JK flip flop,T and D types flip flops, Applications of flip flops, Registers, Applications of registers, Counters, Application of counters.	07	20
5	**Memory architecture:** Semiconductor memories and Programmable logic devices. Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), , ROM as a PLD, Programmable logic array.	06	15

Reference Books:

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.

List of Open-Source Software/learning website:

1. LogiSim software
2. Xcircuit
3. Scilab
4. NPTEL website
5. https://www.vlab.co.in/

Course Learning Outcomes (CLO):

Course Outcomes	Description	Bloom's Taxonomy Level
COL1	Solve the given problem using fundamentals of Number systems and Boolean algebra	Remembering(1) Understanding (2) Applying (3)
COL2	Analyze working of logic gates and design the simple circuits using various gates for a given problem	Remembering(1) Understanding (2) Applying (3)
COL3	Design and implement Combinational and Sequential logic circuits and verify its working	Understanding (2) Applying (3)
COL4	Analyze the memory architecture	Remembering(1) Understanding (2)

Mapping of CLO with PO and PSO

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	L	M		H											
CLO2	H	M			M							L				
CLO3	H	M	M		M											
CLO4	M	M	M		M							L				

H: High, M: Medium, L: Low