

Branch Name:	Information Technology
Program Code:	ET105
Course Title:	Digital Fundamental
Course Code:	2ET1050301T
Pre-requisite Course:	Basic Electronics and Number Systems

Course Objectives:

1. The students need to learn basic concepts of digital circuits and systems which leads to the design of complex digital systems such as microprocessors.
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)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					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	Fundamental Of Number System and Code: Decimal Numbers, Binary Numbers, Decimal to Binary Conversions, Binary Arithmetic, 1's and 2's Complements of Binary Numbers, Signed Numbers, Arithmetic Operations with Signed Numbers, Hexadecimal Numbers, Octal Numbers, Digital Codes, Error Detection Codes.	06	15
2	Logic Gates: The Inverter, The AND Gate, The OR Gate, The NAND Gate, NOR Gate, The Exclusive-OR Gate and Exclusive-NOR Gate; Boolean Algebra and Logic Simplification - Boolean Operations AND Expressions, Laws and Rules, Demorgan's Theorems, Boolean Expressions and Truth Tables, The Karnaugh Map, SOP Minimizations	08	25
3	Combinational Logic Analysis: Basic Combinational Logic Circuits, Implementing Combinational Logic, The Universal Property of NAND And NOR Gates. Functions of Combinational Logic - Basic Adder, Parallel Binary Adders, Comparators, Decoders, Encoders, Code Converters, Multiplexers, Parity Generator/Checkers.	08	25
4	Latches And Flip-Flops: Latches, Edge Triggered Flip-Flops, Flip-Flop Operating Characteristics, Flip-Flop Applications, Registers, Counters	06	20
5	Memory And Storage: Memory Basics, RAM, The ROM, Programmable ROMs, Flash Memory, Memory Expansion, Special Types of Memories, Magnetic and Optical Storage.	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 websites:

1. LogiSim software
2. Xcircuit
3. Scilab
4. NPTEL website
5. <https://www.vlab.co.in/>
6. www.silveroakuni.ac.in

Course Learning Outcomes (CLO):

Course Outcomes	Description	Bloom's Taxonomy Level
COL1	Describe various number system and codes and solve the given problem using fundamentals of Number systems and Boolean algebra.	Remember (1) Understanding (2) Applying (3)
COL2	Summarize different types of logic gates and apply Boolean laws and rules to simplify expressions and circuits using various gates for a given problem	Remember (1) Understanding (2) Applying (3)
COL3	Design and implement Combinational verification of it working	Understanding (2) Applying (3)
COL4	Construct different types of sequential logic circuits like Latches and Flip-Flops	Understanding (2) Applying (3)
COL5	Illustrate the memory concepts and understand the basics of storage in computer.	Remember (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													
CLO2	H	L	M													
CLO3	H	M	M	M				M	L							
CLO4	H	M	M	M				M	L							
CLO5	H	M			M				M							

H: High, M: Medium, L: Low