

Branch Name:	Computer Engineering
Program Code:	ET404
Course Name:	Fundamentals of Digital Electronics
Course Code:	2ET4000209
Pre-requisite Course:	----

Course Objectives: (Min 3)

1. Design sequential and combinational circuits of any electronic device.
2. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
3. To impart how to design Digital Circuits.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	60	40	20	30	150

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	BINARY SYSTEMS Binary Numbers, Types of Number System (Binary, Octal, Decimal, Hexa-Decimal), Number Base conversions, Binary Complement Methods, Binary codes (BCD, XS-3, Parity, Gray Code)	10	24
2	LOGIC GATES Binary Logic, Basic Logic Gates (AND, OR, NOT), Derived Logic Gates (XOR, XNOR), Universal Logic Gates (NAND, NOR), Logic Diagrams using Basic Logic Gates, Logic Gate IC Pin Diagram	08	20
3	BOOLEAN ALGEBRA Postulates, Laws of Boolean Algebra, De-Morgan's Theorems, Basic Boolean Simplifications	08	16
4	K-MAP SIMPLIFICATIONS K-map (Two Variable, Three Variable, Four Variable), Don't Care Condition, Simplification of Boolean Function using K-map, Implement using NAND gate, Implement using NOR gate. Implicit, Explicit	08	20
5	COMBINATIONAL LOGIC Half Adder, Full Adder, Half Subtractor, Full Subtractor, Magnitude Comparator, Decoder, Encoder, Multiplexer, Demultiplexer.	08	20

SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS:

1. Conversion of Number System
2. Realize the basic logic gates.
3. Prove De-Morgan's Theorem.

4. Realize the NAND gate as a universal Gate
5. Realize the NOR gate as a universal Gate
6. Design and implement Half Adder
7. Design and implement Full Adder
8. Design and implement Half Subtractor
9. Design and implement Full Subtractor
10. Realize the Binary Parallel Adder
11. Realize 4:1 Multiplexer
12. Realize 1:4 Demultiplexer
13. Realize 2:4 Decoder
14. Realize 4:2 Encoder.

Text Books / Reference Books:

Sr. No.	Title of Books	Author	Publication
1.	Digital Logic and Computer Design	Morris Mano	Pearson
2.	Modern Digital Electronic	R. P. Jain	Tata McGraw Hill
3.	Digital electronics Principles	Malvino & Leech	Tata McGraw Hill
4.	Fundamentals of Digital Circuits	Anand Kumar	PHI

List of Open-Source Software/learning website:

- a. <https://www.vlab.co.in/>
- b. <https://www.electronics-tutorials.ws/>
- c. <https://www.instructables.com/>
- d. <https://learnabout-electronics.org/>

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

CLO	Description	Bloom's Taxonomy Level
CLO1	To learn various number systems and their conversion used in digital components	2 Understanding 1 Remember
CLO2	To design logic functions using logic gates	2 Understanding 3 Applying
CLO3	To implement logic functions using Boolean algebra and K-map simplifications	3 Applying 6 Creating
CLO4	Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances	3 Applying 6 Creating
CLO5	Convert different type of codes and number systems which are used in digital communication and computer systems.	5, 3, 4, 6 Evaluate, Applying, Analyze, Creating
CLO6	Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.	5, 3, 4, 6 Evaluate, Applying, Analyze, Creating

Course Learning Outcomes	Program Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO1	M											
CLO2	H											
CLO3	H						M					
CLO4	M					L						
CLO5	H	M		M			H					
CLO6	M	L		L								L

H: High, M: Medium, L: Low