

Subject Code: 1ET4000207	Subject Title: Fundamentals of Digital Electronics
Pre-Requisite	--

RATIONALE:

The objective of Fundamental of Digital Electronics is to make the students understand functioning of a digital circuit. The course contains description of digital components using core structure of digital logic. This includes number system, Logic gates, Boolean algebra, Combinational logic. This Course will enable student to solve various Boolean expressions, to design and implement digital logic circuits.

COURSE OBJECTIVE:

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies.

- Design sequential and combinational circuits of any electronic device.

TEACHING AND EVALUATION SCHEME:

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

DETAILS OF COURSE CONTENTS:

SR. NO.	TOPICS	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.	08	20
5	COMBINATIONAL LOGIC Half Adder, Full Adder, Half Subtractor, Full Subtractor, Magnitude Comparator, Decoder, Encoder, Multiplexer, De-Multiplexer.	08	20

COURSE OUTCOME:

1. To learn various number systems and their conversion used in digital components
2. To design logic functions using logic gates
3. To implement logic functions using Boolean algebra and K-map simplifications
4. To understand basic digital components for circuit design

SUGGESTED LIST OF PRACTICALS:

Sr. No.	Practical Exercise
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

LIST OF REFERENCES:

S.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

E-Learning Websites:

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