Fundamentals of Digital Logic Design

Course Code	20CS3301	Year	II	Semester	I
Course Category	PCC1	Branch	CSE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Basic Electrical & Electronics Engg.
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the basic concepts of digital circuits.	L2
CO2	Apply minimization techniques to simplify Boolean expressions.	L3
CO3	Apply the principles of digital electronics to design combinational and sequential circuits.	L3
CO4	Analyze the functionality of combinational circuits and sequential circuits.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	2									1				
CO3													3	
CO4		2							1	1				

Syllabus		Mapped CO
Unit No	**Contents**	
I	**Digital Systems and Binary Numbers:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Binary codes and Binary Logic.	**CO1**
II	**Boolean Algebra and Logic Gates:** Introduction, Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms. **Gate–Level Minimization**: Introduction, Map Method-Two variable, Three variable K-map's, Four Variable K-Map, Product of Sums Simplification, Don't Care Conditions, NAND and NOR implementation.	**CO1, CO2**
III	**Combinational Logic:** Introduction, Combinational Circuit, Analysis Procedure, Design Procedure, Binary adder - subtractor, Decimal Adder, BCD to Seven Segment Display, Encoders, Decoder, Multiplexers, Demultiplexers.	**CO1, CO3, CO4**
IV	**Sequential Logic:** Introduction, **Storage Elements:** Latches –SR, D Latches **Storage Elements: Flip Flops**–SR, JK, D and T Flip Flops, Characteristic tables, Characteristic equation, Excitation tables.	**CO1, CO3, CO4**
V	**Registers and Counters:** Registers, **Shift Registers-** Serial Transfer, Serial Addition, Universal Shift Register, **Ripple Counters-**Binary Ripple Counter, BCD Ripple Counter, **Synchronous Counters-**Binary Counter, Up–Down Binary Counter, BCD Counter, Binary Counter with Parallel Load, **Other Counters-** Ring counter, Johnson counter.	**CO1, CO3, CO4**

Learning Resources
Text Books
1. Digital Design, M. Morris Mano, Michael D.Ciletti, Fifth Edition, 2013, Pearson.
References
1. Switching Theory and Finite Automata, Zvi. Kohavi, Niraj K. Jha, Third Edition, 2010, Cambridge, University Press.
2. Fundamentals of Digital circuits, A. Anand Kumar, Third Edition, 2013, PHI.
e-Resources & other digital material
1. https://nptel.ac.in/courses/106/108/106108099/ http://nptel.ac.in/courses/117106086/1
2. https://nptel.ac.in/courses/117/105/117105080/
3. https://www.udemy.com/course/digital-electronics-logic-design/
4. https://learnabout-electronics.org/Digital/dig20.php
5. https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.htm
6. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/