

# PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

KANURU, VIJAYAWADA-520007

## I B.Tech – I Sem CSE (AI&ML) DIGITAL LOGIC DESIGN

<b>Course Code</b>	20ES1105	<b>Year</b>	I	<b>Semester</b>	I
<b>Course Category</b>	Engineering Sciences	<b>Branch</b>	CSE(AI&ML)	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Elementary Mathematics
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Examination</b>	70	<b>Total Marks:</b>	100

### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Understand the basic concepts of digital circuits.	<b>L2</b>
<b>CO2</b>	Apply minimization techniques to simplify Boolean expressions.	<b>L3</b>
<b>CO3</b>	Apply the principles of digital electronics to design combinational and sequential circuits.	<b>L3</b>
<b>CO4</b>	Analyze the functionality of combinational circuits and sequential circuits.	<b>L4</b>

### 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
<b>CO1</b>	3													
<b>CO2</b>	2													
<b>CO3</b>	3													
<b>CO4</b>		2										1		

Syllabus		Mapped CO's
Unit No	Contents	
I	<b>Digital Systems and Binary Numbers:</b> Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements of Numbers, Arithmetic Addition and Subtraction, Binary codes - BCD, Excess-3, Gray codes and Binary Logic.	CO1
II	<b>Boolean Algebra and Logic Gates:</b> Introduction, Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms <b>Gate-Level Minimization:</b> Introduction, Map Method-Three variable K-Map, Four Variable K-Map, Product of Sums Simplification, Don't Care Conditions	CO1, CO2
III	<b>Combinational Logic:</b> Introduction, Combinational Circuit, Analysis Procedure, Design Procedure, Half adder & subtractor, Full adder & subtractor, Binary adder, Encoders, Decoders, Multiplexers, Demultiplexers.	CO1, CO3, CO4
IV	<b>Sequential Logic:</b> Introduction <b>Storage Elements: Latches –SR</b> <b>Storage Elements: Flip Flops –SR, JK, D and T Flip Flops</b> - Characteristic tables, Characteristic equation, Excitation tables, Conversions of Flip-flops	CO1, CO3, CO4
V	<b>Registers and Counters:</b> Registers, Shift Registers -Serial Transfer, Serial Addition, Universal Shift Register <b>Ripple Counters</b> -Binary Ripple Counter, BCD Ripple Counter <b>Synchronous Counters</b> -Binary Counter, Up-Down Binary Counter, and BCD Counter.	CO1, CO3, CO4

Learning Resources
<b>Text Books</b>
1. Digital Design, M. Morris Mano, Michael D. Ciletti, Fifth Edition, 2013, Pearson.
<b>References</b>
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.
<b>e-Resources &amp; other digital material</b>
1. <a href="https://nptel.ac.in/courses/106/108/106108099/http://nptel.ac.in/courses/117106086/1">https://nptel.ac.in/courses/106/108/106108099/http://nptel.ac.in/courses/117106086/1</a>
2. <a href="https://nptel.ac.in/courses/117/105/117105080/">https://nptel.ac.in/courses/117/105/117105080/</a>
3. <a href="https://www.udemy.com/course/digital-electronics-logic-design/">https://www.udemy.com/course/digital-electronics-logic-design/</a>
4. <a href="https://learnabout-electronics.org/Digital/dig20.php">https://learnabout-electronics.org/Digital/dig20.php</a>
5. <a href="https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.htm">https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.htm</a>
6. <a href="https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/">https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/</a>