

DIGITAL LOGIC DESIGN(Required)**(Only for CSE during I B.Tech., II Semester)****Course Code: CS2T4****Credits:3****Lecture: 3 periods/week****Internal Assessment: 30 marks****Tutorial: 1 periods/week****Semester end examination:70 marks**

Prerequisites: Introduction to Computers

Course Objectives:

1. To study the basic philosophy underlying the various number systems, negative number representation, binary.
2. Arithmetic, binary codes and error detecting and correcting binary codes.
3. To study the theory of Boolean algebra.
4. To study representation of switching functions using Boolean algebra.
5. Expressions and their minimization techniques.
6. To study the combinational logic design of various logic and switching devices and their realization.
7. To study the sequential logic circuits design both in synchronous and Asynchronous modes.
8. Logic and switching devices, their minimization techniques and their realizations.
9. To study some of the programmable logic devices and their use in realization of switching functions.

Course Outcomes:

At the end of this course student will:

CO1) Understand various types of number systems and their conversions.

CO2) Simplify the Boolean expressions and apply the Boolean theorems through logical gates

CO3) Design and implement variety of logical devices using combinational circuits concepts.

CO4) Demonstrate and compare the construction of programmable logic devices and different types of ROM

CO5) Analyze sequential circuits like Registers and Counters using flip-flops.

Course Content/Syllabus:**UNIT : I**

Digital Systems and Binary Numbers: Digital Systems – Number systems and base conversions – Representation of signed Binary Numbers – Binary codes – Logic gates.

UNIT : II

Boolean Algebra : Introduction to Boolean Algebra – Axioms and Laws of Boolean Algebra – Boolean functions – Canonical and Standard Forms.

Gate – Level Minimization : Introduction – Two, Three, Four Variable K-map's – Don't Care Conditions – NAND and NOR implementation.

UNIT : III

Combinational Logic : Introduction to combinational logic circuits – Binary adder and subtractor – Look Ahead Carry Adder - Magnitude comparator – Decoders – Encoders – Multiplexers – Demultiplexers.

UNIT : IV

Memory and Programmable Logic : Introduction to Programmable Logic Devices(PLD's) – Programmable ROM(PROM) – Programmable Logic Array(PLA) – Programmable Array Logic(PAL).

UNIT : V

Synchronous Sequential Logic : Introduction to sequential circuits – Latch – Flip Flop – SR, JK, T, D Flip Flops – Flip Flop excitation tables.

Registers and Counters : Registers – Shift registers – Ripple counters – Synchronous counters – Other counters.

Learning Resources**Text Books :**

1. Digital Logic and Computer Design by M. Moris Mano, 4th Edition.
2. Digital Principles and Applications by Leach, Paul Malvino, 5th Edition.

References :

1. Fundamentals of Digital Logic Design by Charles H.Roth, Jr. 5th Edition, Cengage
2. Digital Electronics by G.K. Kharate, Oxford University Press
3. Switching Theory and Logic Design by A. Anand Kumar, PHI, 2nd Edition

E-learning resources:

<http://nptel.ac.in/courses.php>

<http://jntuk-coeerd.in/>