II B.Tech – II Semester
(20ES4006) DIGITAL LOGIC DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre-Requisites: Analog Electronics

Course Objectives:

- To introduce the basics of binary number system
- To define Boolean theorems and simplification of Boolean expressions
- To design and analyze different combinational logic circuits
- To understand sequential logic circuits and design finite state machines
- To learn basics of registers and counters

UNIT–I: Digital Systems and Binary Numbers

Digital Systems, Binary Numbers, Number based Conversions, Octal & Hexadecimal Numbers, Complements–r's complement, (r-1)'s complement, Signed binary Numbers, Arithmetic addition and subtraction, Binary Codes, Binary Storage & Registers, Floating Point Representation.

UNIT–II: Concept of Boolean algebra and Gate Level Minimization

Basic Definitions, Axiomatic Definitions, Basic Theorems & Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Digital logic gates, The Map Method – Two-Variable, Three-Variable, Four-Variable K-Maps. Product of Sums Simplification, Sum of Products Simplification, Don't Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT–III: Combinational Logic

Introduction, Analysis Procedure, Design Procedure – Code Converters, Binary Adder – Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Boolean Function Implementation using Decoders and Multiplexers, **Programmable Logic Devices:**ReadonlyMemory,ProgrammableLogicArray,ProgrammableArrayLogic.

UNIT–IV: Sequential Logic

Introduction to Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines, Synthesis of Sequential Circuits, State reduction and State Assignment, Design Procedure.

UNIT–V: Registers and Counters

Registers, Shift Registers, Universal Shift register, Ripple Counters – Binary Ripple counter, BCD ripple counter, Synchronous Counters – Binary counter, Up-down Counter, BCD counter. Counters with unused states, Ring Counter, Johnson Counter

Course Outcomes:

After successful completion of the course, the students will be able to:

S.No	Course Outcome	BTL
1.	Discuss different number systems and binary operations.	L2
2.	Simplify logic functions using Boolean theorems and K-maps	L3
3.	Design and analyze combinational circuits and PLDs	L6
4.	Analyze and synthesize Finite State Machines	L4
5.	Construct registers and counters	L3

Correlation of COs with POs& PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	-	-	-	-	-	-	-	-	-	-	1	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	2	1	-	-	-	-	-	-	-	-	-	3	-
CO4	-	3	2	-	-	-	-	-	-	-	-	-	2	-
CO5	-	2	2	-	-	-	-	-	-	-	-	-	3	-

Text Books:

1. Digital Design–M.MorrisMano, Michael D Ciletti, 5th ed.,PEA.
2. Digital Electronics : Principles, Devices & Applications–Anil K.Maini,Wiley.

Reference Books:

1. Digital Logic and Computer Design–M. Morris Mano, PEA.
2. Digital Principles and Applications–Leach, Malvino & Saha, 6th ed., McGraw Hill.
3. Modern Digital Electronics–R.P. Jain, TMH
4. An Engineering approach to Digital Design–William I Fletcher, PHI.