

I B.Tech II Sem

## 15ACS06-DIGITAL LOGIC DESIGN

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**Course Objectives**

- Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.
- Get familiarized with fundamental principles of digital design.
- Acquaint with classical hardware design for both combinational and sequential logic circuits.

**Course Outcomes**

- Ability to interpret, convert and represent different number systems and binary arithmetic.
- Able to design sequential and combinational circuits
- Able to design different units of a digital computer.

**UNIT - I :**

**Binary Systems:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

**Boolean Algebra And Logic Gates:** Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits

**UNIT – II:**

**Gate – Level Minimization:** The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods

**UNIT – III :**

**Combinational Logic:** Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

**UNIT – IV :**

**Synchronous Sequential Logic:** Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure

**Registers & Counters:** Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters

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**UNIT – V :**

**Memory And Programmable Logic:** Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic.

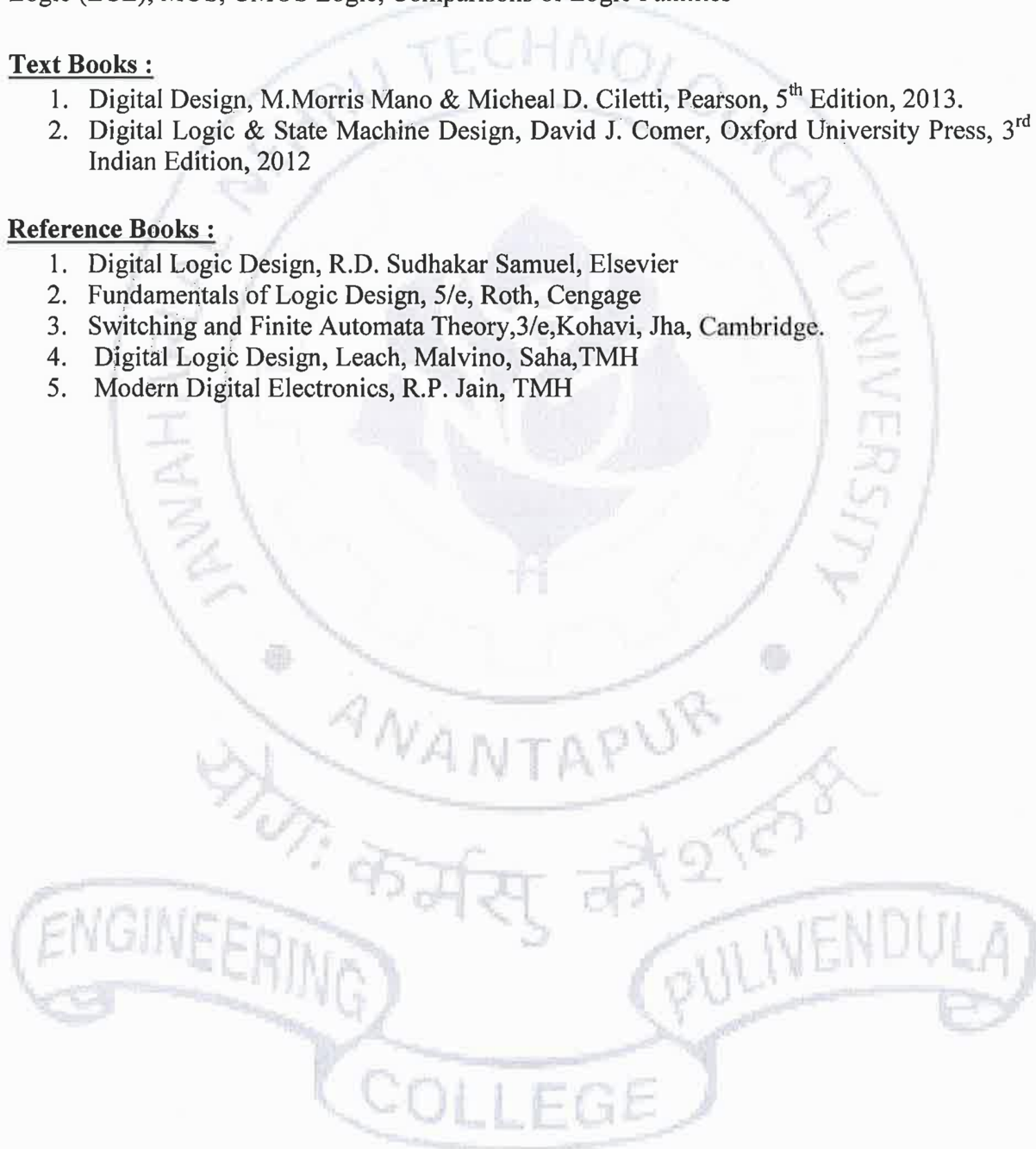
**Digital Logic Circuits:** RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

**Text Books :**

1. Digital Design, M.Morris Mano & Micheal D. Ciletti, Pearson, 5<sup>th</sup> Edition, 2013.
2. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3<sup>rd</sup> Reprinted Indian Edition, 2012

**Reference Books :**

1. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2. Fundamentals of Logic Design, 5/e, Roth, Cengage
3. Switching and Finite Automata Theory, 3/e, Kohavi, Jha, Cambridge.
4. Digital Logic Design, Leach, Malvino, Saha, TMH
5. Modern Digital Electronics, R.P. Jain, TMH



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