

# Digital Logic Design and Applications

S.E. Sem. III [INFT]

---

---

## EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

## SYLLABUS

### 1. Number System

Decimal, Binary, Octal and Hexadecimal number system and conversion, Binary weighted codes and inter-conversion, Binary arithmetic including 1's Complement 2's Complement, Error detection and correction codes.

### 2. Boolean Algebra and Combinational Logic

Boolean Algebra theorems, Realization of switching functions using logic gates, canonical logic forms, sum of product & product of sums, Karnaugh maps, Simplification of expressions, Variable Entered Maps, Quine–McCluskey minimization techniques, Mixed logic combinational circuits and multiple output functions.

### 3. Analysis and Design of Combinational Logic

Introduction to combinational circuit, Decoder, Encoder, Priority encoder, Multiplexers as function generators, Binary adder, Subtractor, BCD adder, Binary comparator, Arithmetic and logic units.

### 4. Sequential Logic

Sequential circuits, Flip–flops, Clocked and edge triggered flip–flops, Timing specifications, Asynchronous and synchronous counters, Counter design with state equations, Registers, Bidirectional Shift registers.

### 5. Programmable Logic Devices

PLAs, PALs, CPLD, FPGA Architectures, Finite state machines – Mealy and Moore design, Introduction to VHDL, Implementation of above combinational and sequential circuits using VHDL, Examples of system design applications like Washing machine, Candy Vending machine, traffic lights

### 6. CAD Tools

Introduction to Computer Aided Synthesis and Optimization, Circuit models, Synthesis, Optimization, Computer Aided Simulation, Verification, Testing and Design for Testability.

### Reference :

1. Digital Systems Principle and Design – (*Raj Kamal*), Pearson Education
2. Digital Logic Design Principles – (*Balabaniam*), Wiley Publications.
3. Digital Design, 3<sup>rd</sup> Edition – (*Morris Mano*), Pearson edition.
4. Modern Digital Electronics – (*R.P. Jain*), McGraw Hill.
5. Digital Principles and Applications – (*D.P. Leach, A.P. Malvino*), TMH
6. Digital Systems : Principles and Applications – (*Tocci*), Pearson
7. A VHDL Primer, 3<sup>rd</sup> Edition – (*J. Bhasker*)
8. Introductory VHDL – (*Sudhakar Yalamanchili, John M. Yarbrough*), Pearson Ed.

