

Core VI

Computer Organization

Course Objectives:

- To understand data representation techniques and used of various logic gates
- To understand the basic components of a digital computer and their working
- To know about various memory devices

Learning Outcomes:

Upon completion of this course, students will be able to:

- Use different number systems and know the function of basic logic gates
- Design various combinational circuits
- Understand the functioning of a digital computer
- Understand the use of various memory devices and their management

Unit-I:

Character Codes, Decimal System, Binary System, Decimal to Binary Conversion, Hexadecimal Notation, Boolean Algebra, Basic Logic Functions: Electronic Logic Gates, Synthesis of Logic Functions, Minimization of Logic Expressions, Minimization using Karnaugh Maps, Synthesis with NAND and NOR Gates, Tri-State Buffers.

Unit-II:

Designing of combinational circuits- Half Adder, Full Adder, Carry-Lookahead Addition, Decoders, Encoders, Multiplexers, Flip-Flops, Gated Latches, Master-Slave Flip-Flops, Edge-Triggering, T Flip-Flops, JK Flip-Flops. Registers and Shift Registers, Counters.

Unit-III:

Basic Structure of Computers - Computer Types, Functional Modules, Basic operational Concepts, Bus Structures, Performance, Multiprocessors and Multi-computers, Input/Output Organization - Accessing I/O devices, Interrupts, Processor examples, Direct memory access, Buses, Interface circuits, Standard I/O interfaces.

Unit-IV:

Memory System - Basic concepts, Semi-conductor RAM memories, Read-only memories, Speed, Size and Cost, Cache Memory: Computer Memory System, Cache Memory Principles, Performance considerations, Virtual Memories, memory management requirements, Secondary Storage.

Text Books:

- ✓ *M. Morris Mano, Michael D. Ciletti (2008), Digital Design, 4th edition, Pearson Education Inc, India.*
- ✓ *Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition, McGraw Hill, New Delhi, India*

Reference Books:

- ✓ *Computer Architecture and Organization: William Stallings, Pearson Education.*
- ✓ *Computer Architecture and Organization: John P. Hayes McGraw Hill.*
- ✓ *Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy, Elsevier.*
- ✓ *Computer Architecture & Organization, Rajiv Chopra, S. Chand Pubs.*