

**CA-C6T: COMPUTER ARCHITECTURE**

Total Teaching Hours: 48

No. of Hours / Week: 03

**UNIT - I**

[12 Hours]

Number Systems: Binary, Octal, Hexa decimal numbers, base conversion, addition, subtraction of binary numbers, one's and two's complements, positive and negative numbers, character codes ASCII, EBCDIC. Computer Arithmetic: Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations. Structure of Computers: Computer types, Functional units, Basic operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Digital Logic Circuits: Logic gates, Boolean algebra, Map Simplification. Combinational Circuits: Half Adder, Full Adder, flip flops. Sequential circuits: Shift registers, Counters, Integrated Circuits, Mux, Demux, Encoder, Decoder. Data representation: Fixed and Floating point.

**UNIT - II**

[12 Hours]

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Timing and Control, Memory-Reference Instructions, Input-Output and interrupt. Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC vs RISC

**UNIT - III**

[12 Hours]

Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit. Micro-programmed Control: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit. Input Output: I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA. Instruction level parallelism: Instruction level parallelism (ILP)-over coming data hazards, limitations of ILP

**UNIT - IV**

[12 Hours]

Memory System: Memory Hierarchy, Semiconductor Memories, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, RAID. Multiprocessors And Thread level Parallelism: Characteristics of multiprocessors, Multi-Threaded Architecture, Distributed Memory MIMD Architectures, Interconnection structures,

**TEXT BOOKS:**

1. Mano M Morris, "Computer System Architecture", 3rd edition Pearson India(2019).
2. William Stallings, "Computer Organization and Architecture designing for performance", 10th edition, Pearson(2016)

**REFERENCE BOOKS**

1. Subrata Ghoshal, "Computer Architecture And Organization", Pearson India(2011).
2. Andrew S. Tanenbaum "Structured Computer Organization", 5th edition, Pearson Education Inc(2006).
3. Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Architecture And Organization", 5<sup>th</sup> edition McGraw Hill New Delhi, India(2002).
4. Kai Hwang, "Advanced Computer Architecture - Parallelism, Scalability, Programmability", Tata Mcgraw-Hill (2008).