AIT 123 COMPUTER ORGANIZATION AND ARCHITECTURE 2(2+0)

Objective(s)

This course benefits the students to have understanding of basic structure and operation of a digital computer. In this course, student learn digital circuits, number system representation, different architectures & organizations of memory systems, process or organization and control unit, various ways of communicating with I/O devices and standard I/O interfaces, Pipeline processing, RISC and CISC architectures and understand the working principles of multiprocessor and parallel organization

UNIT I

Introduction

Introduction to COA, Basic Computer Model and different units of Computer, Basic Working Principle of a Computer **Number System Representation:** Representation of Decimal, Binary, Octal and Hexadecimal Number; Conversation of Numbers, Representation of Unsigned & Sign integer, Representation of real number, Representation of character.

UNIT II

Arithmetic and Logic Unit

Logic Gates: AND, OR, NOT, NAND, NOR, XOR, Exclusive, NOR gates **Boolean algebra:** Introduction, Explanation of Boolean function, Describe truth table, Simplified Boolean function using postulates and draw logical diagram of simplified function, Simplified Boolean function using karnaugh map method. **Sequential And Combinational Circuits:** Introduction to combinational circuit and sequential circuit, half adder, full adder, multiplexer, demultiplexer, encoder, decoder

UNIT III

Memory

Concept of Main Memory, Introduction to Flip Flop and explain SR, Clocked SR, D, JK, T flip flops, Cache Memory, Operations of cache memory, Mapping functions, Replacement algorithms/policy, Memory Management, Virtual Memory, Paging, Allocation of frames, logical and physical address, address translation, address translation process

UNIT IV

Central Processing Unit

Introduction of CPU, Major component of CPU, CPU categories RISC and CISC, Instruction Pipeline, execution of complete instructions, design of control unit, hardwired control, control signals, Run signals, PLA, concept of Multi-Processor / Parallel Processing

UNITV

Input-Output Organization

Concept of input output interface, Programmed Control I/O, Interrupt Control I/O, Direct Memory Access Control I/O, I/O buses, Synchronous bus, Asynchronous bus

Reference Book(s)

1. Computer System Architecture – By Morris Mano (PHI)
2. Digital Logic And Computer Design – By Morris Mano
3. Digital Computer Electronics – By Malvino And Leach