

2/4 B.Tech - SECOND SEMESTER

IT4T5**COMPUTER SYSTEM ARCHITECTURE****Credits: 3****Lecture: 3 Periods/week****Internal assessment: 30 marks****Practice/Interaction: 1Period/week****Semester end examination: 70 marks****Objectives:**

- To have a thorough understanding of the basic structure and operation of a digital computer.
- To get knowledge on the central processing unit and various instructions formats together with a variety of addressing modes.
- To discuss in detail about the operation of the arithmetic unit including the algorithms & Implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the hierarchical memory system including cache memories and virtual memory
- To study the different ways of communicating with I/O devices, concept of pipelining and the way it can speed up the processing, Instruction pipelining and RISC pipelining.

Outcomes:

Students will be able to

- Understand the implementation of micro operations.
- Understand the organization of basic computer and its design.
- Understand central processing unit and various instructions formats together with a variety of addressing modes.
- Understand the organization of the Control unit, Arithmetic and Logical unit, Memory unit.
- Analyze the concepts of I/O communication, pipeline and vector processing.

Prerequisites:

Digital System Design.

Syllabus:**UNIT-I**

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.

UNIT-II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-Output and Interrupt

UNIT-III

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro-Program example. CENTRAL PROCESSING UNIT: General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control

UNIT-IV

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Arithmetic operations.

MEMORY ORGANIZATION: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory.

UNIT-V

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor.

PIPELINE AND VECTOR PROCESSING: Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline, Risc pipeline. Organization of Intel 8085 Micro-Processor.

Text Book:

1. Computer System Architecture, Morris M. Mano, 3rd Edition, Prentice Hall India.

Reference Books:

1. Computer Organization and Architecture, William Stallings, 8th Edition, PHI
2. Computer Organization, Carl Hamachar, Vranesic, McGraw Hill.

e-Learning Resources:

1. <http://jntuk-coeerd.in/>
2. <http://nptel.ac.in/courses.php>
3. <http://freevideolectures.com/Course/2277/Computer-Organization#>