

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech II - II sem (C.S.E)

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(15A05402) COMPUTER ORGANIZATION

Course Objectives:

- To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
- To make the students understand the structure and behavior of various functional modules of a computer.
- To understand the techniques that computers use to communicate with I/O devices
- To study the concepts of pipelining and the way it can speed up processing.
- To understand the basic characteristics of multiprocessors

Course Outcomes:

- Ability to use memory and I/O devices effectively
- Able to explore the hardware requirements for cache memory and virtual memory
- Ability to design algorithms to exploit pipelining and multiprocessors

Unit I:

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

Unit II:

Arithmetic: Addition and Subtraction of Signed Numbers, Design and Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, Multiprogrammed Control.

Unit III:

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

Unit IV:

Input/output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

Unit V:

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose, Interconnection Networks.

Textbook:

1) “Computer Organization”, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, McGraw Hill Education, 5th Edition, 2013.

Reference Textbooks:

1. Computer System Architecture, M.Morris Mano, Pearson Education, 3rd Edition.
2. Computer Organization and Architecture, Themes and Variations, Alan Clements, CENGAGE Learning.
3. Computer Organization and Architecture, Smruti Ranjan Sarangi, McGraw Hill Education.
4. Computer Architecture and Organization, John P.Hayes, McGraw Hill Education.