

COMPUTER ORGANIZATION

Course Code: 22EC11D5

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Prerequisites: - Switching Theory and Logic Design.

COURSE OUTCOMES:

At the end of the Course the student shall be able to:

CO 1: Identify functional units and illustrate register transfer operations.

CO 2: Explain the internal organization of the computer and its instructions.

CO 3: Make use of fixed and floating point algorithms and analyze micro program instructions.

CO 4: Summarize the memory organization and pipelining concepts.

CO 5: Illustrate data transfer between central computer and I/O devices.

UNIT-I

10 Lectures

Basic structure of Computers: Computer types, Functional units, Basic operational concepts, Bus structure, software, performance, multiprocessors and multi computers. (Text Book-2)

Register Transfer Micro operations: Register Transfer Language, Bus and Memory Transfers, Arithmetic, Logic, Shift Micro operations, Arithmetic Logic Shift Unit.

Learning Outcomes: At the end of the module the student will be able to

1. explain the functional units of the computer (L2)
2. illustrate register transfer operations. (L2)
3. construct combinational circuit to perform various operations (L3)

UNIT-II

10 Lectures

Basic Computer organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input-Output and Interrupt.

Central Processing Unit: General Register organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation Instructions, RISC,CISC

Learning Outcomes: At the end of the module the student will be able to

1. interpret different types of computer instructions (L2)
2. explain the phases in instruction cycle (L2)
3. make use of various addressing modes (L3)
4. differentiate between CISC and RISC (L2)

UNIT-III

10 Lectures

Micro programmed Control: Control memory, Address Sequencing, Micro program Example, Design of Control Unit.

Computer Arithmetic: Fixed point and floating point number representation, Addition and Subtraction, Multiplication, Division, Floating Point Arithmetic Operations.

Learning Outcomes: At the end of the module the student will be able to

1. illustrate the micro program with an example (L2)
2. distinguish between hardwired and micro programmed control units (L2)
3. apply fixed and floating point algorithms to perform arithmetic operations (L3)

UNIT-IV

10 Lectures

Memory Organization: Memory Hierarchy, Main Memory, Associative Memory, Cache Memory, Cache Memory and its Mapping Techniques, replacement algorithms, write policies

Pipeline: Pipelining, Arithmetic pipeline, Instruction Pipeline and RISC Pipeline.

Learning Outcomes: At the end of the module the student will be able to

1. compare different types of memories (L2)
2. explain mapping techniques of cache memory (L2)
3. illustrate the process of pipelining (L2)

UNIT-V

10 Lectures

Parallel processing: Introduction to parallel processors, concurrent access to memory and cache coherence, Flynn's classification

Input-Output organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

Learning Outcomes: At the end of the module the student will be able to

1. illustrate the process of parallel processing (L2)
2. outline the concept of Input-output interface.(L2)
3. compare the modes of data transfer techniques (L2)

TEXT BOOK:

1. M. Moris Mano, *Computer Systems Architecture*, 3rd Edition, Pearson Education, 2007

REFERENCES:

1. William Stallings, *Computer Organization and Architecture*, 10th Edition, Pearson Education, 2016.
2. Carl Hamacher, Zvonks Vranesic, SafeaZak , *Computer Organization* , 5th Edition, TMH,2011.
3. David A Patterson, John L Hennessy, *Computer Organization and Design*, 4th Edition (2014), Morgan Kaufmann

ONLINE RESOURCE

1. <https://nptel.ac.in/courses/106103068/pdf/coa.pdf> --Module-1 to Module-10