Computer Organization		
Course Frame Work		
Credits: L-T-P: 3- 0 -0		**Total Credits: 3**
Contact Hours/Week: 4	**Direct Teaching Hours: 45**	**Total Contact Hours: 45**

Course Learning Objectives: This course will enable the students to

- Understand the fundamental computer units with its basic terminologies
- Learning the basic operation of arithmetic and handling of numbers inside the computer
- Relate the working of memory unit in reading, writing and deleting the data from memory.
- Understand the concept of Input/Output devices organization along with interrupt handling and its bus structures.
- Understand bus organization within CPU, structures of instruction, concept of pipelining and hazards.

Course Outcomes: On completion of the course, student would be able to:

COs	Course outcomes	RBT
CO1	Understand the fundamental units of computer and logic behind all arithmetic operations performed in handling the data.	L1
CO2	Describe various types of memory operations and machine instructions	L1
CO3	Illustrate the interrupt handling and managing I/O devices.	L2
CO4	Explain various memory organization and devices along with its various functions.	L2
CO5	Explain fundamental concepts of bus organization and pipelining	L2

Syllabus	Hours
Module-1	**09**
BASIC FUNCTIONAL UNITS OF COMPUTERS: Functional units, Operational concepts, Bus structures, Software, Performance, Multiprocessors, Multicomputer. **DATA REPRESENTATION AND ARITHMETIC**: Number representation, fixed and floating-point Representations. Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms.	
Module – 2	**09**
MACHINE INSTRUCTIONS AND PROGRAMS: Memory Location and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language, Basic Input and Output Operations, Stacks and Queues, Subroutines, Additional Instructions, Encoding of Machine Instructions.	
Module – 3	**09**
INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices, Hardware Interrupts – Enabling and Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Exceptions. Direct Memory Access - Bus Arbitration, Processor bus, Interface Circuits, Standard I/O Interfaces – PCI Bus.	
Module-4	**09**
MEMORY ORGANIZATION: Memory Technologies and Memory hierarchy: Main Memory-RAM and ROM. Cache memory- Mapping functions - Associate, Direct, Set Associative mapping. Replacement algorithms, Interleaving, virtual memory.	
Module-5	**09**
CENTRAL PROCESSING UNIT ORGANIZATION: Fundamental Concepts: Bus organization, Control sequence, Execution of a Complete Instruction. Pipelining: Overview of pipelining, instruction pipeline, Hazards – data and instructions, Introduction to CISC and RISC	

Text Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

Reference Books:

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.
2. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry ii. F. Jordan, Pearson Education.
3. Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill

e-Material:

Web links and Video Lectures (e-Resources):

1. https://nptel.ac.in/courses/106/103/106103068/

2. https://nptel.ac.in/content/storage2/courses/106103068/pdf/coa.pdf

3. https://nptel.ac.in/courses/106/105/106105163/

4. https://nptel.ac.in/courses/106/106/106106092/

5. https://nptel.ac.in/courses/106/106/106106166/

Activity Based Learning/Practical Based Learning

Discussion on real world use cases

Quizzes