COMPUTER ORGANIZATION

Credits: 4   **Semester: III**

Subject Code : DS18302   **No. of Lecture Hours: 75**

Objectives:

- To have a thorough understanding of the basic structure and operation of a digital computer. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the different ways of communicating with I/O devices and to study the hierarchical memory system including cache memories and virtual memory.

Outcome: Students will be able to

CO1: Understand basic Circuit designing and number systems

CO2: Explain about how data transferred from one register to another register

CO3: Construct designing of control unit and Central Processing Unit

CO4: Classify different types of computer arithmetic operations

CO5: Categorize all peripheral devices and memory

UNIT – I

15hrs

1. **Digital Logic Circuits:** Digital Computers & Logic Gates	1
2. Boolean Algebra & Map Simplification	1
3. Combinational Circuits	1
4. Flip-Flopsand Sequential Circuits	2
5. **Digital Components:** Integrated Circuits & Decoders	1
6. Multiplexers	1
7. Registers and Shift Registers	1
8. Binary Counters & Memory Unit	1
9. **Data Representation:** Data Types & Complements	2
10. Fixed- and Floating-Point Representation	2
11. Other Binary Codes and Error Detection Codes	2

UNIT – II

15hrs

1. **Register Transfer and Microoperations:** Register Transfer language & Register Transfer	2
2. Bus and Memory Transfer	1
3. Arithmetic Microoperations	2
4. Logic Microoperations	2
5. Shift Microoperations & Arithmetic Logic Shift Unit	2
6. **Basic Computer Organization and Design:** Instruction Codes	1
7. Computer Registers	1

8. Computer Instructions and Timing and Control 1
9. Instruction Cycle 1
10. Memory Reference Instructions 1
11. Input-Output and Interrupt 1

UNIT – III

15hrs

1. **Microprogrammed Control:** Control Memory & Address Sequencing 2
2. Microprogram Example 2
3. Design of Control Unit 2
4. **Central Processing Unit:** Introduction, General Register Organization 2
5. Stack Organization 3
6. Instruction Formats & Addressing Modes 2
7. Data Transfer and Manipulation & Program Control

UNIT-IV

15hrs

1. **Pipeline and Vector Processing**: Parallel Processing, Pipelining 1
2. Arithmetic Pipeline, Instruction Pipeline 2
3. **Computer Arithmetic:** Addition and Subtraction 3
4. Multiplication Algorithms 3
5. Division Algorithms 3
6. Floating-Point Arithmetic Operations 3

UNIT – V

15hrs

1. **Input-Output Organization:** Peripheral Devices & I/O Interface 2
2. Asynchronous Data Transfer 2
3. Modes of Transfer 2
4. Direct Memory Access 1
5. Input-Output Processor-CPU IOP Communication and Serial Communication 2
6. **Memory Organization:** Memory Hierarchy 2
7. Main Memory, Auxiliary Memory, 2
Associative Memory, Cache Memory