

## MC119-Computer Organization

**Objective:** This course is intended to teach the basics involved in data representation and digital logic circuits used in the computer system. This includes the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design. This course will also expose students to the basic architecture of processing, memory and i/o organization in a computer system.

### **Learning Outcomes:**

The student will be able to:

- Identify, understand and apply different number systems and codes.
- Understand the digital representation of data in a computer system.
- Understand the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design.
- Understand computer arithmetic formulate and solve problems, understand the performance requirements of systems

### **UNIT - I**

**Data representation and Logic circuits:** Number System, complements, fixed point representation, floating point representation, binary codes, error detection codes. Logic gates, Boolean algebra, maps simplification, combinational circuits, flip flops, sequential circuits.

### **UNIT - II**

**Digital components and RTL:** integrated circuits, decoders, multiplexers, registers, shift registers, binary counters, memory unit. Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

### **UNIT - III**

**Basic Processing Unit:** Instruction codes, Computer Registers, Computer instructions – Instruction cycle, Memory – Reference Instructions. Input – Output and Interrupt. STACK organization, Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction set computer.

### **UNIT - IV**

**Micro Programmed Control and Computer Arithmetic:** Control memory, Address sequencing, micro program example, design of control unit, Hard-wired control. Micro programmed control unit Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

### **UNIT -V**

**The Memory System and IOP:** Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory. Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access.

### **Text Books:**

1. Computer System Architecture, Morris Mano, 3rd Edition.
2. Computer organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

### **Reference Books:**

1. Computer System Architecture, Naush Jotwani- 7MM.
2. Digital Electronics, James W Bignel, Robert Donovan, 5th Edition, Cengage Learning Publications.
3. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.
4. Taub & Schilling: Digital integrated electronics , McGraw-Hill
5. R P Jain : Digital Electronics, 4th Edition TMH.