

Microprocessor and Computer Architecture

Course Title: Microprocessor and Computer Architecture

Full Marks: 60 + 20 + 20

Course No: BIT151

Pass Marks: 24 + 8 + 8

Nature of the Course: Theory + Lab

Credit Hrs: 3

Semester: II

Course Description:

This course aims at providing fundamental knowledge about computer architecture, Instruction cycle, components of Microprocessor, Intel 8085 and assembly programming.

Course Objectives:

The main objective of this course is to provide basic knowledge of components of Microprocessor, block diagram and assembly language programming using Intel 8085, SAP1 and SAP2 computer architecture, timing diagrams, instruction cycles, machine cycles, control unit, central processing unit, RISC, CISC, Direct Memory Access, Interrupts, serial and parallel interfaces.

Course Contents:

Unit 1: Introduction to Microprocessor (6 Hrs.)

Components of a Microprocessor: Registers, ALU, Control and Timing, System Buses, Microprocessor Systems with Bus Organization, Introduction to SAP1 and SAP2

Unit 2: Intel 8085 (8 Hrs.)

Functional Block Diagram and Pin Configuration, Timing and control Unit, Registers, Data and Address Bus, Intel 8085 Instructions, Operation Code and Operands, Addressing Modes, Interrupts, Flags, Institutions and Data Flow inside 8085, Basic Assembly Language Programming Using 8085 Instruction Sets

Unit 3: Microoperations (3 Hrs.)

Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit

Unit 4: Control Unit and Central Processing Unit (9 Hrs.)

Control Unit of Basic Computer, Computer Arithmetic (Adder, Subtractor, Divider, and Multiplier), Timing Signal, Micro-Instruction and Micro-Operation Format, Symbolic Microinstructions, Symbolic Micro-program, Binary Micro-Program, Register Organization, Register Stack and Memory Stack, Data transfer and Manipulation, Introduction to RISC and CISC

Unit 5: Fixed point Computer Arithmetic (5 Hrs.)

Addition and Subtraction, Multiplication, Division Algorithm

Unit 6: Input and Output Organization (5 Hrs.)

Introduction to Peripheral Devices, I/O interface, Direct Memory Access (DMA), I/O Processor, Data communication processor

Unit 7: Memory Organization (5 Hrs.)

Hierarchy of Memory System, Primary and Secondary Memory, Virtual Memory, Memory Management hardware

Unit 8: Pipelining (4 Hrs.)

Concept of Pipelining, Arithmetic Pipeline, Instruction Pipeline, Data Dependency, Handling of branch Instruction

Laboratory Works:

The laboratory works should be carried out in 8085 trainer kit. The programming should include arithmetic operation, base conversion, conditional branching etc.

Text Books:

1. Ramesh S. Gaonkar: Microprocessor Architecture, Programming, and Applications with 8085, prentice Hall
2. Morris Mano: Computer system Architecture, Third Edition, prentice Hall

Reference Books:

1. Malvino: Digital Computer system Electronics (An introduction to Microcomputers)
2. Douglas V. Hall: Microprocessor and Interfacing programming and Hardware, McGraw Hill