IT 236: Microprocessor and Computer Architecture

BIM 3rd Semester

Credits: 3
Lecture Hours: 48

Course Objectives

The main objective of this course is to provide fundamental knowledge of microprocessors and computer architecture.

Course Description

This course aims to provide fundamental concepts of microprocessor and computer architecture including instruction cycle, components of microprocessor, Intel 8085 and assembly programming.

Course Details

Unit 1: Introduction to Microprocessor **6 LHs**

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

Unit 2: Intel 8085 **8 LHs**

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 **4 LHs**

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

Unit 4: Central Processing Unit and Control Unit and **10 LHs**

Introduction; Register Organization; Stack Organization; Instruction Format; Addressing Modes; Data Transfer and Manipulation; RISC and CISC.

Unit 5: Pipelining **4 LHs**

Parallel Processing and Pipelining; Arithmetic Pipeline; Instruction Pipeline.

Unit 6: Computer Arithmetic **5 LHs**

Addition and Subtraction; Multiplication Algorithms; Division Algorithms.

Unit 7: Input and Output Organization **5 LHs**

Peripheral Devices; Input-Output Interface; Asynchronous Data Transfer; Modes of Transfer; Priority Interrupt; Direct Memory Access; Input-Output Processor; Serial Communication.

Unit 8: Memory Organization **6 LHs**

Memory Hierarchy; Main Memory; Auxiliary Memory; Associative Memory; Cache Memory; Virtual Memory; Memory Management Hardware.

Laboratory Works:
The laboratory work should cover realizing different operations using 8085 trainer kit.

Suggested Readings

- ***Microprocessor Architecture, Programming, and Applications*** *with 8085*, Ramesh S. Gaonkar, Prentice Hall.
- ***Computer system Architecture,*** Morris Mano, Prentice Hall.
- ***Digital Computer System Electronics***, Albert Paul Malvino.
- ***Microprocessor and Interfacing Programming and Hardware***, Douglas V. Hall, McGraw Hill.
- *Modern Computer Architecture and Organization: Learn x86, ARM, and RISC-V architectures and the design of smartphones, PCs, and cloud servers*, Jim Ledin, Packt Publishing.