

Broad Objective

To study 8086 Microprocessor architecture, instructions, and be able to use it to write assembly language programs. Apply the knowledge of various peripheral component to interface with the microprocessor. Demonstrate Basic knowledge of 8081 microcontrollers.

Course Objectives

1. To gain knowledge and understanding of 8086 Microprocessor architecture and be able to write assembly language programs.
2. To learn how to interface commonly used peripheral devices to 8086.
3. To gain knowledge of interrupt structure of 8086, differentiate microprocessors and microcontrollers, and gain basic knowledge of 8051 microcontroller.

SYLLABUS

UNIT-1 Introduction to 8086, Instruction Set

Features of 8086, Architecture of 8086; Register organization; Memory segmentation; Addressing modes;

Instruction set, data transfer instructions; Miscellaneous data transfer instructions; Arithmetic instructions; Logical instructions

UNIT-2 Instruction set of 8086, Simple programs

Shift and rotate instructions; String instructions, CALL and RET ; Jump instructions, Conditional Jump, Iteration control instructions; Processor control, External Hardware Synchronization instructions, Interrupt instructions.

Assembler Directives, Variables, Suffix, and Operators; PUBLIC, EXTERN directives, Steps involved in programming, Difference between Assembly language and Machine Language; Programming with an assembler (Assembling, linking, debugging process), Simple programs: Multi number addition, Multi byte number addition; Programs: Two BCD numbers addition, Average of 5 numbers, Largest of 5 numbers, Search for a number, Count even and odd numbers.

UNIT-3 Programming, Memory Interfacing

Part -1

Timing and delays; Data conversions: Binary to ASCII; ASCII to Binary; Read Hexadecimal data, Display hexadecimal data.

Lookup tables for data conversion; Procedures; Macros; Program to read input from keyboard and display on the monitor, Procedure to calculate factorial of a number, Find LCM of two numbers.

Part 2

8086 Signal description (Pin diagram), Common pins; Minimum mode and Maximum mode pins; Physical memory organization, I/O addressing capacity; General 8086 system bus structure and operation, Basic system timing diagram.

Minimum mode configuration; Maximum mode configuration; Basic concepts in memory interfacing, Memory Decoding methods; Memory interfacing examples, Interfacing two 4K x 8 RAM chips and two 4K x 8 EPROM chips with 8086 microprocessors.

UNIT-4 DMA, 8255, ADC, DAC

Types of data transfers, 8257 DMA Controller Pin diagram; Block diagram of 8257, Operating modes; 8255 Pin diagram, block diagram; Mode 0 and BSR mode operation, Interfacing switches and LEDs;

DAC 0808 Pin diagram and Operation; Interfacing DAC, Program; ADC0808 Pin diagram and Operation; Interfacing ADC, Program.

UNIT-5 Interrupts of 8086, Introduction to 8051

Interrupts of 8086, Interrupt Cycle of 8086, Types; Interrupt Vector Table; Difference between microcontroller and microprocessor, 8051 microcontroller features. Block diagram; Pin diagram, Organization of memory.

Register set of 8051; Timers and Counters, TCON register; Serial communication SCON, PCON register; Interrupts of 8051.

Text Books:

1. Microprocessors and Interfacing, AP Godse, DA Godse, Technical Publications.
2. The 8051 Microcontrllers and Enbedded Systems, Mazidi and Mazidi, Pearson.

Course outcomes

At the end of the course the learner shall be able to

1. Gain knowledge of 8086 architecture and instruction set.

2. Write simple assembly language programs and know how to interface memory devices.
3. Have a knowledge of commonly used peripheral devices, and basic knowledge of 8051 microcontroller.
4. Demonstrate assembly language programming of 8086.
5. Design logic for interfacing memory and peripheral devices
6. Understand 8051 architecture.
7. Design and develop microprocessor based computing systems.

Microprocessors & Interfacing

KNOWLEDGE CONCEPTS

UNIT-1 Introduction to 8086, Instruction Set

Cluster-1

CG1:

KC1: Features of 8086, Architecture of 8086

KC2: Register organization

KC3: Memory segmentation

KC4: Addressing modes

CG2:

KC1: Instruction set, data transfer instructions

KC2: Miscellaneous data transfer instructions

KC3: Arithmetic instructions

KC4: Logical instructions

UNIT-2 Instruction set of 8086, Simple programs

Cluster-2

CG1:

KC1: Shift and rotate instructions

KC2: String instructions, CALL and RET

KC3: Jump instructions, Conditional Jump, Iteration control instructions

KC4: Processor control, External Hardware Synchronization instructions, Interrupt instructions

CG2:

KC1: Assembler Directives, Variables, Suffix, and Operators

KC2: PUBLIC, EXTERN directives, Steps involved in programming, Difference between Assembly language and Machine Language

KC3: Programming with an assembler (Assembling, linking, debugging process), Simple programs: Multi number addition, Multi byte number addition

KC4: Programs: Two BCD numbers addition, Average of 5 numbers, Largest of 5 numbers, Search for a number, Count even and odd numbers.

UNIT-3 Programming, Memory Interfacing

Cluster-3

CG1:

KC1: Timing and delays

KC2: Data conversions: Binary to ASCII

KC3: ASCII to Binary

KC4: Read Hexadecimal data, Display hexadecimal data

CG2:

KC1: Lookup tables for data conversion

KC2: Procedures

KC3: Macros

KC4: Program to read input from keyboard and display on the monitor, Procedure to calculate factorial of a number, Find LCM of two numbers.

Cluster-4

CG1:

KC1: 8086 Signal description (Pin diagram), Common pins

KC2: Minimum mode and Maximum mode pins

KC3: Physical memory organization, I/O addressing capacity

KC4: General 8086 system bus structure and operation, Basic system timing diagram.

CG2:

KC1: Minimum mode configuration

KC2: Maximum mode configuration

KC3: Basic concepts in memory interfacing, Memory Decoding methods

KC4: Memory interfacing examples, Interfacing two 4K x 8 RAM chips and two 4K x 8 EPROM chips with 8086 microprocessors.

UNIT-4 DMA, 8255, ADC, DAC

Cluster-5

CG1:

KC1: Types of data transfers, 8257 DMA Controller Pin diagram

KC2: Block diagram of 8257, Operating modes

KC3: 8255 Pin diagram, block diagram

KC4: Mode 0 and BSR mode operation, Interfacing switches and LEDs

CG2:

KC1: DAC 0808 Pin diagram and Operation

KC2: Interfacing DAC, Program

KC3: ADC0808 Pin diagram and Operation

KC4: Interfacing ADC, Program

UNIT-5 Interrupts of 8086, Introduction to 8051

Cluster-6

CG1:

KC1: Interrupts of 8086, Interrupt Cycle of 8086, Types

KC2: Interrupt Vector Table

KC3: Difference between microcontroller and microprocessor, 8051 microcontroller features. Block diagram.

KC4: Pin diagram, Organization of memory.

CG2:

KC1: Register set of 8051

KC2: Timers and Counters, TCON register

KC3: Serial communication SCON, PCON register

KC4: Interrupts of 8051.

Text Books:

1. Microprocessors and Interfacing, AP Godse, DA Godse, Technical Publications.
2. The 8051 Microcontrllers and Enbedded Systems, Mazidi and Mazidi, Pearson.