

MICROPROCESSOR AND INTERFACING	
<b>CSE 222</b>	<b>Credits : 3</b>
Instruction : 3 Periods & 1 Tut/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

### Prerequisites:

Basic knowledge of Digital Logic Design and Computer Organization.

### Course Objectives:

1. The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessors.
2. Assembly language programming will be studied for practical implementation of the programs in trainer kit.
3. Learning the concept of interfacing various I/O peripherals like Keyboard/Display, stepper motor etc., with microprocessors using 8255 PPI.
4. To provide solid foundation on interfacing the external devices to the processor according to the user requirements to create novel products and solutions for the real time problems.
5. The accompanying lab is designed to provide practical hands-on experience with microprocessor software applications and interfacing techniques

### Course Outcomes

the end of the course, the student will be able to:	
1.	Describe the architecture and pin configuration of 8085 Microprocessors and the significance of Addressing modes, timing diagrams and analyze the working of instruction set.
2.	Demonstrate the programming knowledge for practical implementation of assemble level programming using instruction set of 8085.
3.	Analyze the working of 8085 interfacing with co-processors are 8255, 8251, 8253, 8259, 8279 and External I/O devices.
4.	Describe the architecture and pin configuration of 8086 Microprocessors and the significance of Addressing modes, Segmented memory and Min-Max mode operations
5.	Demonstrate the programming knowledge for practical implementation of assemble level programming using instruction set of 8086.

### Mapping of Course Outcomes with Program Outcomes:

Mapping		PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO	1	3	1							3	1			1	2
	2	3	3	2	2	2				1	1				1
	3	3	3	3						2					
	4	2	1	2										1	
	5	3	3	2	2	2				1	1				1

## SYLLABUS

### UNIT I

15 periods

#### Introduction to 8085 Microprocessor

Introduction to Microprocessors and Microcomputers, Internal Architecture and Functional / Signal Description of typical 8-bit  $\mu$ P. 8085, Instruction Set, types of Instructions, Addressing modes of 8085 and Timing Diagrams of 8085  $\mu$ P.

**Learning Outcome:** At the end of this Unit the students will be able to

- Draw and describe the basic architecture of 8085 and the functional description of 8085.
- List the Instruction set; state the addressing modes and timing diagrams of 8085.

## **UNIT II**

**10 periods**

### **8085 $\mu$ P Assembly Language Programming**

Introduction to Assembly Language Programming Techniques: Looping, Counting, and Indexing, Counter and timing Delays, Stack and Subroutines, Code Conversions, BCD Arithmetic operations , 16-bit data Operations, Interrupts and Interrupt Service Routines.

**Learning Outcome:** At the end of this Unit the students will be able to

- Develop the assembly language programs using various programming techniques
- Analyze the simple programs of call instructions, sorting, and string manipulations.

## **UNIT-III**

**15 periods**

### **Interfacing Peripheral ICs to Intel 8085**

Programmable peripheral interface (8255A), Programmable communication interface (8251), Programmable Interval timer (8253 and 8254), Programmable Interrupt controller (8259), Programmable Keyboard / Display controller (1 8279).

**Learning Outcome:** At the end of this Unit the students will be able to

- Illustrate how the different peripherals (8255, 8251, 8253, 8259, 8279.) are interfaced with Microprocessor.
- Describe the control word formats of all Programmable peripheral interfaces.

## **UNIT IV**

**12 periods**

### **Introduction to 8086 Microprocessor**

Internal Architecture and Functional/Signal Description of 8086/8088, Segmented Memory, Maximum-Mode and Minimum-Mode Operation and Addressing Modes of 8086.

**Learning Outcome:** At the end of this Unit the students will be able to

- Describe the modes and functional block diagram of 8086 along with pins and their functions.
- Develop the assembly language programs using various programming techniques.

## **UNIT V**

**8 periods**

### **8086 $\mu$ P Assembly Language Programming**

Instruction Set and Timing Diagrams, Interrupts and Interrupt Service Routines, Assembler Directives, Loops Procedures, Modular programming and Macros, .COM and .EXE formats.

**Learning Outcome:** At the end of this Unit the students will be able to

- Used the programming techniques of 8086 to build programs using instruction set.
- List, describe and use different types of instruction, directives and interrupts.

**Case Study:** Introduction to Pentium and Multi-Core Processors and Arduino processors.

### **TEXT BOOKS:**

1. Ramesh S. Gaonkar, “Microprocessor Architecture, Programming, and Applications with the 8085” Penram International, 6th Edition.
2. John E.Uffenbeck, “The 80x86 Family, Design, Programming and Interfacing 3rdEdition, Pearson Education Inc.”, 2002.

## REFERENCE BOOKS:

1. BARRY B. BREY, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 and 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, Architecture, Programming and Interfacing", Pearson Education Inc., 2003, 6th Edition.
2. Walter A. Tribel and Avtar Singh, "The 8088 and 8086 Microprocessors, Programming, interfacing, Software, Hardware, and Applications", Pearson Education Inc., 2003, 4th Edition.
3. Douglass V. Hall, "Microprocessors and Interfacing, Programming and Hardware", TMH Edition, 1999, 2nd Edition
4. Sanjay K Bose, "Hardware and Software of Personal Computers", New Age International (P) Ltd., 1991.
5. A.P. Mathur, "Introduction to Microprocessor", Tata McGraw-Hill Education, 1989.
6. YU-Cheng Liu & Glenn A Gibson, "Microprocessor System, Architecture Programming & Design".

## ONLINE WEB RESOURCES:

1. <https://www.tutorialspoint.com/microprocessor/index.htm>
2. [https://swayam.gov.in/nd1\\_noc20\\_ee11/preview](https://swayam.gov.in/nd1_noc20_ee11/preview)
3. <https://medium.com/@harshityadav95/microprocessor-and-interfacing-ef9c2b116382>
4. <http://pages.hmc.edu/harris/cmosvlsi/4e/lect/lect24.pdf>
5. <https://www.arduino.cc/>

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