Lok Jagruti Kendra University
University with a Difference

Diploma
in
Information Technology

Course Code: 025040305

Microprocessor & Interfacing Techniques

Programme / Branch Name		Diploma in Information Technology			
Course Name	Microprocessor & Interfacing Techniques			**Course Code**	025040305
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses   BSC: Basic Science Courses
ESC: Engineering Science Courses   PCC: Program Core Courses
OEC: Open Elective Courses   PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	2	4	50	50	50	150

Legends:

L: Lectures   T: Tutorial   P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th):   Semester End Evaluation (Theory)
SEE (Pr):   Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Basic knowledge of computer hardware components
- ✓ Fundamentals of digital integrated circuits
- ✓ Basic knowledge of computer languages

3. Rationale

A Microprocessor is an important part of a computer architecture without which we will not be able to perform anything on our computer. Microprocessor chips are widely used in business machines, automotive electronics, home appliances, electronic toys, and a variety of industrial applications. This course has been mainly focused on the fundamentals of the 8085 microprocessor. Studying the 8085 internal architecture students will be able to understand any processor in a jiff.
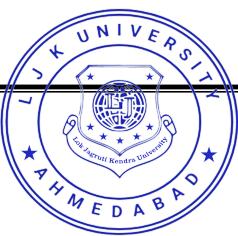
4. Objectives

- ✓ This course aims to help the students to attain the following industry-identified competency through various teaching-learning experiences.
  - Describes the functioning of different peripheral ICs
  - Development of maintainable assembly language program for an algorithm
  - Interfacing with different devices

5. Contents

| Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Architecture of 8085**	1.1. Introduction to Computer System 1.2. Details of 8085 architecture 1.3. Bus Organization of 8085: Address, Data and Control buses, Demultiplexing of bus 1.4. Description of 8085 pins and signals 1.5. Machine cycle: Opcode fetch, Memory read, Memory write, I/O write, I/O read	• Deals with the fundamentals of the 8085 microprocessors • Provides insight into the various registers and their main functions • Explains the various machine cycles needed for executing a variety of instructions	20	9
2	**8085 Instruction set**	2.1. Introduction 2.2. Instruction size: Single byte instructions, Two byte instruction, Three byte instruction 2.3. Addressing modes 2.4. Instruction classification: Data transfer group of instruction, Arithmetic group of instruction, Logical group of instruction, NOP and Stack group of instruction, Branch group of instruction	• Elaborates on the data transfer group of instructions with meaningful examples • Deals with the arithmetic group of instructions and explain the various flags • Explains the various addressing modes • Focus on the logical, stack, and branch group of instructions	25	10
3	**Interrupts in 8085**	3.1. Overview of Interrupt 3.2. Types of Interrupts: Software interrupt, Hardware interrupt 3.3. Enabling and disabling interrupts 3.4. Vectored and Non-Vectored interrupt process 3.5. SIM and RIM	• Explains different types of interrupts • Discusses in detail the use of interrupts	15	6
4	**Interfacing using 8085 Microprocessor**	4.1. Interfacing I/O devices 4.2. Programmable Interface Devices: 8155 and 8279	• Explains the different types of I/O Devices interfacing	20	9

		4.3. 8254(8253) Programmable Interval Timer 4.4. 8259A Programmable Interrupt Controller 4.5. 8255A Programmable Peripheral Device	• Illustrates how to attach external devices • Working with IC-8255A to connect with different devices		
5	**Advanced Microprocessor**	5.1. Details of 8086 architecture: Bus Interface Unit, Execution Unit, 5.2. Register organization and flag register 5.3. Memory segmentation 5.4. Instruction Pipelining 5.5. Pin diagram of 8086	• Reviews the 8086 microprocessors • Explains the execution of program instructions	20	8

	Total Hours	**42**

6. List of Practical / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/program outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practicals / Exercises	Key Competency	Hours
1	Implement assembly language programs for Data Transfer from register to memory and register to memory.	Various techniques of reading and writing data from memory	2
2	Implement assembly language programs for Data Transfer from register to register.	Read and write data from the register to register	2
3	Implement assembly language programs for DAA Arithmetic instructions.	Various arithmetic operations with different addressing mode	2
4	Implement assembly language programs for ADD and Double Addition Arithmetic instruction.	ADD operation with different addressing modes	2
5	Implement assembly language programs for Subtract Arithmetic instruction.	Subtract operation with different addressing modes	2
6	Implement assembly language programs related to Logical instructions. (AND, OR, and XOR)	Various logical operations with different addressing modes	4
7	Implement a program to perform the multiplication and division of two 8 bit numbers.	Concept of multiplication and division operations	2
8	Implement a program to compare two 16-bit numbers.	Concept of the comparison operation	2
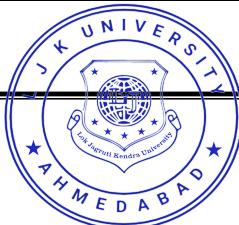
9	Implement assembly language programs related to Rotate instructions. (RLC, RRC, RAL, RAR)	Various techniques of rotation operations	2
10	Implement a program to move/copy the block of memory to another given location and the length of the block is given in a specific memory location.	Concept of data transfer operations with and without memory overlapping	2
11	Implement a program to find a given number in the list of 10 numbers, if found store 1 in output else stores 0 in output.	Concept of looping and searching	2
12	Develop/Execute an Assembly language program to alternatively blink LEDs connected on Port–B of 8255 at random intervals. Draw an Interface diagram.	Interface Diagram and Applications of IC-8255	2
13	Develop/Execute an Assembly language program for 8255 to Interface keypad and display an LED.	Programming and Interfacing of IC-8255	2
		Total Hours	**28**

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Architecture of 8085	35	30	25	-	5	5
2	8085 Instruction set	30	30	25	5	5	5
3	Interrupts in 8085	25	35	25	5	5	5
4	Interfacing using 8085 Microprocessor	25	25	30	10	5	5
5	Advanced Microprocessor	35	30	25	-	5	5

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Text Books

1) Microprocessor Architecture, Programming, and Application with the 8085 by Ramesh Gaonkar, Latest Edition, Penram Mumbai.
2) Microprocessor & Interfacing Programming and Hardware by Douglas Hall, Latest Edition, Tata McGraw Hill publication.

9. Reference Books

1) 8085 Microprocessors & Its Application, Nagoor Kani, Latest Edition ,Tata McGraw Hill publication.

10. Open Sources (Website, Video, Movie)

1) https://nptel.ac.in/courses/108/105/108105102/
2) https://www.geeksforgeeks.org/microprocessor-tutorials/
3) https://www.tutorialspoint.com/microprocessor/microprocessor_8085_architecture.htm