Marwadi University
Faculty of Diploma Studies
Information and Communication Technology

Subject Code: 09CT0402
Subject Name: Microprocessor and Assembly Language Programming
Diploma Year – II (Semester IV)

Objective: Microprocessor is brain of every computing system and highly important in hardware Computing Applications. This course explores architecture of a microprocessor and its programming in assembly language. The student will be able to apply the knowledge of architecture and assembly language program to develop real time microprocessor based application programs.

Credits Earned: 04 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Understand the architecture and pin diagram of 8085 microprocessor.
2. Write, Debug & Simulate assembly language program of 8085 microprocessors.
3. Apply the concept of assembly language program to generate time delay into 8085 microprocessors.
4. Develop counter and waveform using assembly language program.
5. Understand applications and features of advance Microprocessor.

Pre-requisite of course: Digital Logic Design.

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
3	0	2	4	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Introduction to 8085 Microprocessor** Evolution of Microprocessors, Microprocessor Bus organization, Operations of microprocessor, Memory: Classification and characteristics.	06
2.	**8085 microprocessor Architecture** Introduction, 8085 features, Functional block diagram of 8085, Pin functions, Address, Data and Control buses, Demultiplexing of buses, Generation of control signals.	06
3	**Instruction Set:**	10

	Assembly Language Programming Basics, Classification of Instructions, 8085 Instruction Set, Instruction and data Formats, Addressing Modes, instruction cycle, machine cycle and Timing diagram.	
4	**Assembly Language Programming:** Looping, counting and indexing using data transfer, arithmetic, logical and branch instructions. Stack & Subroutines, Time Delay routines. Illustrative programs : counter design, generation of pulse wave form.	10
5	**8085 Interrupts** Interrupts concept and process, Classification of Interrupts, Interrupts Priorities, Vectored interrupt. Comparison of hardware and software interrupts.	05
6	**Introduction to advanced Processors** Differentiate between RISC and CISC processors, Intel's advance processor, Features of ARM processor.	05
	Total Hours	42

Suggested Text books / Reference books:

1. Microprocessor Architecture, Programming, and Application with the 8085 (9th edition) , Gaonkar,Ramesh , Penram Mumbai Publication
2. 8085 Microprocessor and its application, Kani, A. Nagoor, Mc Graw Hill 2013
3. Microprocessor 8085 : Architecture, Programming, And Interfacing by Ajay Wadhwa

Suggested Theory distribution:

The suggested distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
40%	40%	10%	10%	00%	00%

Suggested List of Experiments:

1. Demonstration of Kit / Simulator of 8085
2. Implement Program to perform operations related to data transfer instructions.
3. To Perform Arithmetic Operation (Add, Subtract, Multiply, Divide) on 8 bit and 16 bit.

4. Add the content of memory location X500h, X501h and store the result at memory locations X503h and X504H.
5. Implement program to Perform logical Operations (AND, OR , NOT , Exclusive OR etc.) on 8 bit numbers.
6. Load the data byte 56H in register D and E7H in register E. Mask the higher order bits (D7-D4) from both the data bytes, Exclusive OR the lower –order bits (D3-D0).
7. Implement a program to shift an eight bit data four bits right. Assume data is in register C.
8. Implement a Program to check whenever given number is odd or even
9. Implement a program to find largest/smallest number from array of 5 numbers.
10. Perform a program to sort given 10 numbers stored from memory location XX00 in ascending order.
11. Perform a program to count continuously in hexadecimal from FFH to 00H with 1ms delay between each count.
12. Implement a program to alter the content of flag register using stack related instructions.
13. Implement a program to generate continuous square wave with a period of 500us. Assume the system clock period is 325.5ns and use bit D0 to output for the square wave. (LED blinking)

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2. The internal evaluation will be done based on continuous evaluation of students in the laboratory.
3. Students need to present their work on regular interval basis.

Supplementary Resources:

1. https://nptel.ac.in/courses/108107029/
2. https://github.com/8085simulator/8085simulator.github.io
3. https://www.tutorialspoint.com/microprocessor/index.htm