NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	MTech CSE
Course Code:	6CS279ME25
Course Title:	Microprocessors and Architecture
Course Type:	Department Elective-II
Year of Introduction:	2025-26

L	T	Practical Component				C
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –
1. outline the basics of various architectural units of the computer system (BL2)
2. make use of various structural components for microprocessor architecture (BL3)
3. develop logic for programs in assembly language for using microprocessors and microcontrollers (BL4) (BL6)
4. design and develop microprocessor-based customized systems.

Unit	Contents	Teaching Hours (Total 30)
Unit-I	**Central Processing Unit:** Introduction, General register organization, Stack organization, Instruction formats, addressing modes, Data transfer and manipulation, Program control, Reduced instruction set computer (RISC). Complex Instruction Set Computer (CISC)	04
Unit-II	**Intel 8086/88 Architecture:** CPU Architecture, Internal operation, Machine Language Instructions, Addressing modes, Instruction formats, Instruction Execution Timing	05
Unit-III	**Assembly language programming:** Assembler instruction format, data transfer, Arithmetic, Branch, loop, NOP, Call, Flag manipulations, logical shifts, rotate instructions, directives and operators	11
Unit-IV	**Modular Programming:** Linking and relocation, stacks, procedures, interrupt routines, macros, program design examples.	10

Self-Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Suggested Readings/ References:

1. Douglas V Hall, Microprocessors and Interfacing: Programming and Hardware, McGraw Hill
2. R S Gaonkar, Microprocessor Architecture, Programming and Applications with the 8085, Penram Publication
3. M. Morris Mano, Computer System Architecture, Prentice Hall
4. Yu-Cheng Liu, 8086/8088 family, Prentice Hall
5. Barry B. Brey, The Intel microprocessors, Prentice Hall
6. Peter Abel, IBM PC Assembly language and programming, Pearson.

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Suggested List of Experiments:

Sr. No.	Name of Experiments/Exercises	Hours
1	a) Introduction to debugging. (Prepare a report on debug with all its commands) b) Introduction to programming with assembler with an example of the addition of two numbers. Exploring the usage of debug commands.	04
2	Perform binary arithmetic operations on two 16-bit numbers and two 32-bit numbers. Write a program using 'C' to perform inline assembly	02
3	Find the maximum and minimum of numbers in an array	02

4	a) Convert a number from an octal number system to a binary number system.
	 b) Convert lowercase string to uppercase and vice versa
	     i/p AMP Program
	     o/p Program
		04

5	Arrange numbers in ascending order.	02
6	a) Add ten numbers and find their average. b) Find the number of 1's of a given 8-bit number to determine its parity. c) Convert string to integer and vice versa using a far procedure with stack parameter passing	02
7	Reverse a string entered by the user using the near procedure	04
8	a) Find the occurrences of a character from the entered string. b) Write a program to find a substring from a given string using a near procedure. Take the string and the substring from the user	04
9	Generate the Fibonacci series using far procedure and display the series	04
10	Check whether the number is prime, odd, even, etc, using far procedures a) in the same assembly module and b) in different assembly modules c) Implement a copy command for copying one file to the other. Study of 8254 timer chip and its interfacing	02