Course Name: Computer Organization & Assembly Language

Credit Hours: 2-1

Contact Hours: 2-3

Pre-requisites: Digital Logic Design

Course Introduction:

aims to provide students with a fundamental understanding of the structure and operation of modern computer systems. This course will cover topics such as basic computer architecture, instruction set architecture, assembly language programming, memory systems, input/output operations, and processor design.

CLO No	Course Learning Outcomes	Bloom Taxonomy
CLO-1	Understand the organization and operation of modern computer systems, including processors, memory, input/output devices, and storage media.	C2 (Understand)
CLO-2	Understand the concept of interrupts, and be able to design and implement interrupt service routines.	C2 (Understand)
CLO-3	Apply and write programs in assembly language, including arithmetic and logical operations, branching and looping constructs, and input/output operations.	C3 (Apply)
CLO-4	Understand the concept of addressing modes, and be able to analyze and write programs that use different addressing modes.	C4 (Analyze)

Course Outline:

#	Weekly Distribution of Course Contents
Week-1	Introduction to Computer Organization
Week-2	Instruction Set Architecture and Basic machine instructions
Week-3	Addressing modes, Assembly language syntax and structure
Week-4	Data definition directives, Arithmetic and logical operations
Week-5	Direct addressing mode and Indirect addressing mode
Week-6	Indexed addressing mode
Week-7	Base-plus-offset addressing mode
Week-8	Introduction to interrupts, Interrupt handling in assembly language
Week-9	Interrupt vector table, Memory hierarchy
Week-10	Cache memory organization, Cache coherence and consistency
Week-11	Virtual memory
Week-12	Input/output operations in computer systems
Week-13	Direct memory access (DMA),
Week-14	Basic concepts of processor design
Week-15	Computer Arithmetic, Basic concepts of computer security
Week-16	Buffer overflow attacks and countermeasures, Software security

Reference Materials:

17. "Computer Organization and Architecture: Designing for Performance" by William Stallings (11th edition, 2020)

18. "Computer Organization and Design: The Hardware/Software Interface" by David A. Patterson and John L. Hennessy (5th edition, 2014)

19. "Computer Systems: A Programmer's Perspective" by Randal E. Bryant and David R. O'Hallaron (3rd edition, 2016)