Course Title	**Computer Organization & Assembly Language Lab**		
Course Code	**CC-210-L**		
Credit Hours	3 (2,1)		
Category	Computing core		
Prerequisite	CC-110 Digital Logic Design		
Co-Requisite	None		
Follow-up	None		
Course Introduction	The main objective of this course is to introduce the organization of computer systems and usage of assembly language for optimization and control. Emphasis should be given to expose the low-level logic employed for problem solving while using assembly language as a tool. At the end of the course the students should be capable of writing moderately complex assembly language subroutines and interfacing them to any high-level language.		
Course Learning Outcomes (CLOs)	At the end of the course, the students will be able to:	**BT**	**PLO**
	CLO1: Acquire the basic knowledge of computer organization computer architecture and assembly language	C2 (Understand)	1
	CLO2: Understand the concepts of basic computer organization, architecture, and assembly language techniques	C2 (Understand)	2
	CLO3: Solve problems related to computer organization and assembly language	C3 (Apply)	3,4,5
Course Description	**Topics:** Introduction to computer systems, Evolution of Intel Microprocessor, Introduction to Assembly Language, Computer Organization, The Components of a Microcomputer System, Instruction Cycle, Memory Architecture, Memory Representation & Hierarchy, Data, Address, Control Busses, Intel 8086 family of Microprocessors, Organization of Intel 8088/8086 Processor, Registers and their categories Function of Registers, Memory Addressing, Real Mode Memory Structure, Memory Segmentation (Segment/Offset Scheme), Computer Instructions for Basic computer (Memory Reference, Register Reference and I/O instructions), Addressing modes, Instruction Cycle, Timing and Decoding, RTL of the instructions, Complete flow chart for the Basic Computer Operation, Addressing Modes, Design of the CPU of a basic computer Assembly Language Syntax, Program data, Variables, Variables, Program Structure, Memory Models, Data Segments, Stack Segment, Code Segment, Variants of MOV instruction, Some Basic Instructions, XCHG,ADD, SUB, INC, DEC,NEG, Input and Output Instructions, The Processor Status and Flags Register, Flow Control Instructions, Unconditional Jump, Various Conditional Jumps, Looping Structures, Logic Instructions, AND, OR,XOR, NOT, TEST, Shift Instructions, Rotate Instructions, Procedures to Input Binary, Decimal, Hexadecimal Numbers, Procedures to output Binary, Decimal, Hexadecimal Numbers, The Stack, PUSH and POP Instructions, CALL and RET instructions, MUL instruction, DIV instruction, Related Programming examples, XLAT instruction, String Instructions, MOVSB/W, LOADSB/W, STOSSB/W, SCASB/W, CMPSB/W , File Operations, Reading a File, Writing a File		
Text Book(s)	1. Charles Marut, Ytha Yu, Assembly Language Programming and Organization of the IBM PC, 1st Edition, McGraw-Hill, 1992, ISBN: 9780070726925. 2. M. Morris Mano, Computer System Architecture, 3rd Edition, Pearson, 1993, ISBN: 9780131755635.		
Reference Material	1. Barry B. Brey, The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro-Processor, Pentium II, Pentium III, Pentium 4", 7th Edition, Prentice Hall, 2005, ISBN: 0131195069. 2. Kip R. Irvine, Assembly Language for Intel Based Computers, 4th Edition, Prentice Hall, 2002, ISBN: 9780130910134.		