Course Code	**CS233**
Course Title	**Computer Organization and Assembly Language**
Cr Hrs	4 (3+1)
Pre-requisite	CS131 (Digital Logic And Design)
Recommended Texts	1. Computer Organization and Design, David A. Patterson, John L. Hennessy, Morgan Kaufmann publisher, 2016, ISBN-13: 978-0124077263 2. Principles of Computer Organization and Assembly Language, Patrick Juola, Pearson publisher, 2015, ISBN-13: 978-0131486836 3. Assembly Language for Intel-based Computers, Kip R. Irvine, 5th Ed, Prentice Hall Publishing, 2006, ISBN: 978-0130910134 4. Computer Organization Assembly Language, Micheal Thorne, 2nd Ed, Addison Wesley, 1991, ISBN: 978-0805368796. 5. Professional Assembly Language, Richard Blum, 1st Edition, Wrox Publisher, 2005, ISBN: 978-0764579011
Course Description	Computer Organization and Assembly Language is aimed to enable students to study and explore in detail the machine representation of instructions and data using a modern digital computer. This course enables students to study microprocessor addressing and the mechanism behind data movement between memory and microprocessor. Student will also experiment to program interrupts and to perform interrupt driven I/O. Basic machine organization are studied. The course will focus on the most popular Intel 80x86 microprocessor. It is suggested for the benefits of students to use emu8086 emulator for the entire course in order to avoid any compatibility issues that may arise due to the recent advancements in contemporary processors and Operating Systems.
Course Objectives	The main objectives 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.

Week Wise Distribution of the Contents

Lecture Number	Topics
W1	Introduction to the course. The need to study assembly language Resources (books, assemblers, emulators etc) • General concepts about microcomputer, microprocessors • objectives and perspective of assembly language • Instruction execution cycle • Reading/writing to memory • programmable CPU registers and their categories 16-bit, 32-bit and 64-bit registers
W2	Bus and bus types Microprocessors bus Structure Address, data and control lines of a bus
W3	Memory Organization and Structure Linear and segmented memory models
W4	Addressing modes
W5	Introduction to the Assembler and Debugger
W6	Register programming: Data movement, arithmetic Addressing: Indirect addressing, arrays, Indexed operands, Pointers Flags register: flags description
W7	Programming various flags
W8	Program Control Instructions: jump and loop instructions
W9	Subroutines: run time stack (32-bit)
W10	Stack operations (push, pop)
W11	Defining and Using procedure: Call, RET and Proc directives Nested procedure call, passing register arguments to procedures
W12	64-bit programming
W13	64-bit addition and subtraction
W14	Linking to an external library Peripherals Control Interrupts
W15	Interfacing with High Level Languages
W16	Course Review, guidelines for final term exam