COMPUTER ORGANIZATION AND ARCHITECTURE

IV Semester: CSE / IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACSB07	Core	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes:60		

COURSE OBJECTIVES:

The course should enable the students to:

I. The basic concepts of the various functional units and characteristics of computer systems.
II. The concepts of central processing unit design and perform basic operations with signed and unsigned integers in decimal and binary number systems.
III. The function of each element of a memory hierarchy and compare the different methods for computer input and output.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1 Explain the structure, characteristics of computer systems and the various functional units for understanding the components of computers.
CO 2 Demonstrate the computer languages, machine, symbolic and assembly levels for understanding execution of program.
CO 3 Recall the number system their representations and conversion for the usage of instructions in digital computers.
CO 4 Demonstrate the register transfer language, represent memory and Arithmetic/ Logic/ Shift operations for implementation of micro-operations.
CO 5 Illustrate the basics of hardwired and micro-programmed control of the CPU which generates the control signals to fetch and execute instructions.
CO 6 Compare different types of addressing modes for specifying the location of an operand.
CO 7 Identify the different instruction set architecture and their impact on computer design.
CO 8 Explain the input and output system and interfacing for communicate with the other components
CO 9 Analyze the data transfer methods and their control mechanisms for understanding process of transferring data
CO 10 Explain the subroutine and interrupt mechanisms for understanding execution of specific task.
CO 11 Design simple assembly language program that make appropriate use of memory and register.

MODULE-I	INTRODUCTION TO COMPUTER ORGANIZATION	Classes: 08

Basic computer organization, CPU organization, memory subsystem organization and interfacing, input or output subsystem organization and interfacing, a simple computer levels of programming languages, assembly language instructions, instruction set architecture design, a simple instruction set architecture.

MODULE-II	ORGANIZATION OF A COMPUTER	Classes: 10
Register transfer: Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, logic micro operations, shift micro operations; Control unit: Control memory, address sequencing, micro program example, and design of control unit.		
MODULE-III	**CPU AND COMPUTER ARITHMETIC**	**Classes: 08**
CPU design: Instruction cycle, data representation, memory reference instructions, input-output, and interrupt, addressing modes, data transfer and manipulation, program control. Computer arithmetic: Addition and subtraction, floating point arithmetic operations, decimal arithmetic unit.		
MODULE-IV	**INPUT-OUTPUT ORGANIZATION AND MEMORY ORGANIZATION**	**Classes: 10**
Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory; Input or output organization: Input or output Interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.		
MODULE-V	**MULTIPROCESSORS**	**Classes: 09**
Pipeline: Parallel processing, pipelining-arithmetic pipeline, instruction pipeline; Multiprocessors: Characteristics of multiprocessors, inter connection structures, inter processor arbitration, inter processor communication and synchronization.		

Text Books:

1. M. Morris Mano, "Computer Systems Architecture", Pearson, 3rdEdition,2007.
2. John D. Carpinelli, "Computer Systems Organization and Architecture", Pearson, 1stEdition,2001.
3. Patterson,Hennessy,"ComputerOrganizationandDesign:TheHardware/SoftwareInterface",Morgan Kaufmann, 5thEdition,2013.

Reference Books:

1. John. P. Hayes, "Computer System Architecture", McGraw-Hill, 3rd Edition,1998.
2. Carl Hamacher, Zvonko G Vranesic, Safwat G Zaky, "Computer Organization", McGraw-Hill, 5th Edition,2002.
3. William Stallings, "Computer Organization and Architecture", Pearson Edition, 8th Edition,2010.

Web References:

1. https://www.tutorialspoint.com/computer_logical_organization/
2. https://www.courseera.org/learn/comparch
3. https://www.cssimplified.com/.../computer-organization-and-assembly-language-programming

E-Text Books:

1. https://www.groupes.polymtl.ca/inf2610/.../ComputerSystemBook.pdf
2. https://www.cse.hcmut.edu.vn/~vtphuong/KTMT/Slides/TextBookFull.pdf