COMPUTER ARCHITECTURE

OE – I: VI Semester: ECE / EEE
OE –II: VII Semester: AERO / MECH / CIVIL

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACSC24	Elective	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

I. COURSE OVERVIEW:

This course intended to provide the structure, internal working and implementation of a computer system. The fundamentals of various functional units of computer, computer instructions, addressing modes, computer arithmetic and logic unit, registers, data transfer, memory and input output system. It focuses on analysis of computer performance and functioning in modern computers.

II. COURSE OBJECTIVES:

The students will try to learn:

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

III. COURSE OUTCOMES:

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

CO 1	**Illustrate** the structure, characteristics of computer systems and the various functional units for understanding the components ofcomputers.	Understand
CO 2	**Demonstrate** the computer languages, machine, symbolic and assembly levels for understanding execution of program.	Understand
CO 3	**Make use of** the number system their representations and conversion for the usage of instructions in digital computers.	Apply
CO 4	**Summarize** the register transfer language, represent memory and Arithmetic/ Logic/ Shift operations for implementation of micro operations.	Understand
CO 5	**Identify** the basics of hardwired and micro-programmed control of the CPU which generates the control signals to fetch and execute instructions.	Apply
CO 6	**Compare** different types of addressing modes for specifying thelocation of an operand.	Analyze

IV. SYLLABUS

MODULE – I: INTRODUCTION TO COMPUTER ORGANIZATION (09)

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

MODULE –II: ORGANIZATION OF A COMPUTER (09)

Register transfer: Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, logic micro operations, shift micro operations; Control memory.

MODULE –III: CPU AND COMPUTER ARITHMETIC (09)

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 (09)
Input or output organization: Input or output Interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.

MODULE –V: MEMORY ORGANIZATION (09)
Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory; Pipeline: Parallel processing, Instruction pipeline.

V. TEXT BOOKS:

1. M. Morris Mano, "Computer Systems Architecture", Pearson, 3rd Edition, 2015.
2. Patterson, Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Morgan Kaufmann, 5th Edition, 2013.

VI. 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.

VII. 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

VIII. E-TEXT BOOKS:

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