COMPUTER ORGANIZATION AND ARCHITECTURE

II Year II Semester: IT /CSIT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
A5IT06	PCC	L	T	P	C	CIE	SEE	Total
		3	1	-	4	30	70	100

COURSE OBJECTIVES:

The course should enable the students to:

1. Analyze basic components and understand the Architecture and organization of a computer
2. Demonstrate key skills of constructing cost-effective computer systems
3. Apply register transfer and micro programmed control operations.
4. Analyze memory and I/O systems.

COURSE OUTCOMES:

At the end of the course students will be able to:

1. Identify various components of computer and their interconnection
2. Identify basic components and design of the CPU: the ALU and control unit.
3. Compare and select various Memory devices as per requirement.
4. Compare various types of IO mapping techniques
5. Critique the performance issues of cache memory and virtual memory

UNIT-I **STRUCTURE OF COMPUTERS** **Classes: 11**

STRUCTURE OF COMPUTERS: Computer types, Functional units, Basic operational concepts, Von Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Data representation, Fixed and Floating point, Error detection and Hamming codes

UNIT-II **BASIC COMPUTER ORGANIZATION AND DESIGN** **Classes: 13**

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Memory-Reference Instructions.

UNIT-III **REGISTER TRANSFER AND MICRO-OPERATIONS** **Classes: 12**

Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC vs RISC

UNIT-IV MEMORY SYSTEM Classes: 11

REGISTER TRANSFER AND MICRO-OPERATIONS: Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit.

MICRO-PROGRAMMED CONTROL: Address Sequencing, Micro-Program, Design of Control Unit

UNIT-V INPUT OUTPUT Classes:13

MEMORY SYSTEM: Memory Hierarchy, Semiconductor Memories, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, RAID.

INPUT OUTPUT: I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA.

Text Books:

1. M. Morris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India.

2. John P. Hayes (1998), Computer Architecture and Organization, 3rd edition, Tata McGrawHill

Reference Books:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition,McGraw Hill, New Delhi, India.
2. William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy.
3. Anrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education
Inc,