SYLLABUS:

COMPUTER ORGANIZATION AND ARCHITECTURE

B.Tech. II Year I Semester							
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**	
CS2104PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**	
Prerequisites: No Prerequisites							

Course Objectives:

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, micro programmed control unit,pipelining and vector processing, memory organization and I/O systems and multiprocessors

Course Outcomes:

- Understand the basics of instructions sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

COURSE SYLLABUS

MODULE- I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

MODULE- II

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

MODULE- III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating–point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

MODULE- IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

MODULE- V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

MultiProcessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, cache Coherence.

TEXT BOOK:

1. Computer System Architecture–M.MorisMano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization–Carl Hamacher, Zvonks Vranesic, Safea Zaky,

VthEdition, McGrawHill.

2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.

3. Structured Computer Organization – Andrew S.Tanenbaum, 4thEdition, PHI/Pearson.