Program	Bachelor of Technology (B.Tech.)	**Semester - 4**
Type of Course	Core Courses	
Prerequisite	Basic knowledge of digital logic, number systems, and fundamental programming concepts.	
Rationale	To understand computer structure, functional units, and arithmetic operations. To analyze basic computer organization, instruction cycle, and addressing modes. To apply register transfer and micro-operations for data and control flow. To evaluate memory systems and performance optimization techniques. To design input-output systems and ways for multiprocessors to communicate with each other	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				**Examination Scheme**				
Lecture	**Tutorial**	**Lab**	**Credit**	**Theory Marks**		**Practical Marks**		**Total Marks**
				T	**T**	**P**	**P**	
3	-	-	3	70	30	-	-	100

***SEE** - Semester End Examination, **T** - Internal Theory, **P** - Internal Practical*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	**Topics**	**T**	**W**
1	**STRUCTURE OF COMPUTERS:** Computer types, Functional units, Basic operational concepts, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Data representation, Fixed and Floating point COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations.	**12**	**20**
2	**BASIC COMPUTER ORGANIZATION AND DESIGN:** Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Timing and Control, Memory-Reference Instructions, Input-Output and interrupt. Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation.	**12**	**20**
3	**REGISTER TRANSFER 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. MICRO-PROGRAMMED CONTROL: Design of Control Unit.	**12**	**20**
4	**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.	**12**	**20**
5	**INPUT OUTPUT:** I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA. MULTIPROCESSORS: Characteristics of multiprocessors, Interconnection structures, Inter Processor Arbitration, Inter processor Communication and Synchronization, Cache Coherence	**12**	**20**
	Total	**60**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	10	20	30	20	10	10

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Remember the basic structure of computers, types, and data representation methods.
CO2	Understand instruction formats, memory-reference instructions, and CPU organization.
CO3	Apply register transfer and micro-operations in data processing and control unit design.
CO4	Analyze different memory types, hierarchy, and performance techniques.
CO5	Evaluate I/O systems and multiprocessor architectures for system efficiency.

Reference Books

1.	**Computer Organization and Architecture (TextBook)** By William Stallings
2.	**Computer System Architecture (TextBook)** By M. Morris Mano | Pearson