

II- Year II- Semester	Name of the Course	L	T	P	C
ES2201	Computer Organization	3	0	0	3

Course Objectives:

1. To understand basic structures of computers and to understand various machine instructions.
2. To understand basic structures of computers and to understand various machine instructions.
3. To analyse ALU & I/O organization of a computer.
4. To understand various memory systems.
5. To analyse functionalities done by processing unit and also learn micro programmed control.

Unit – I: Basic Structure of a Computer and Machine Instructions.

8 Hrs

Introduction, History of Computer Generations, Functional unit, Basic Operational concepts, Bus structures, System Software, Performance. Number representation: Fixed Point and Floating Point representation. Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types

Unit – II: Addressing modes and types of Instructions

10Hrs

Addressing Modes, Basic Input/output Operations, and role of Stacks and Queues in computer programming equation.

Component of Instructions: Logical Instructions, shift and Rotate Instructions. Type of Instructions: Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations

Unit – III: Basic building blocks for the ALU:

10Hrs

Adder, Subtractor, Shifter, Multiplication and division circuits. Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)

Unit – IV: The Memory Systems

10Hrs

Basic memory circuits, Memory System Consideration, Read- Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Associative Memory, Cache Memories: Mapping Functions, INTERLEAVING, Secondary Storage: Magnetic Hard Disks, Optical Disks.

Unit – V: Processing unit

10Hrs

Fundamental Concepts: Register Transfers, Performing an Arithmetic or Logic Operation, Fetching a Word from Memory, Execution of Complete Instruction, Hardwired Control, MICRO PROGRAMMED CONTROL: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field.

Text Books:

1. Computer Organization, Carl Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Architecture and Organization by William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003

Reference Books:

1. Computer Architecture and Organization, John P. Hayes, 3rd Edition, McGraw Hill.
2. Computer System Architecture by M Morris Mano, Prentice Hall of India, 2001

Course Outcomes: By the end the of the course, the student will be able to

CO-1: Able to **understand** basic structures of computers and to **understand** various machine Instructions.

CO-2: Able to **learn and use** the addressing modes and types of instructions.

CO-3: Able to analyze I/O organization of a computer.

CO-4: Able to **understand** various memory systems.

CO-5: Able to **analyze** functionalities done by processing unit and also learn micro programmed control.

CO-PO Mapping Matrix:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	2	-	2	-	-	-	-	-	-	-	-	-	-	2
CO3	-	2	2	-	-	-	-	-	-	-	-	-	2	-
CO4	-	2	2	-	-	-	-	-	-	-	-	-	2	-
CO5	2	2	2	1	-	-	-	-	-	-	2	2	2	2

Micro Syllabus of Computer Organization

UNIT I: Basic Structure of a Computer and Machine Instructions.		
Unit	Module	Micro Content
UNIT I	Introduction	Introduction, History of Computer Generations, Functional unit
		Basic Operational concepts, Bus structures, System Software, Performance
	Number representation	Integer - unsigned, signed (sign magnitude, 1's complement, 2's complement);
		Characters - ASCII coding, other coding schemes;
		Real numbers - fixed and floating point, IEEE754 representation
	Instruction and Instruction Sequencing	Register Transfer Notation
		Assembly Language Notation
		Basic Instruction Types
UNIT – II: Addressing modes and types of Instructions		
Unit	Module	Micro Content
UNIT II	Addressing modes	Addressing Modes
		Basic Input/output Operations

		Role of Stacks and Queues in computer programming equation
	Component of Instructions	Logical Instructions Shift and Rotate Instructions.
	Type of Instructions	Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations
UNIT – III: Basic building blocks for the ALU		
Unit	Module	Micro Content
UNIT III	Basic Building blocks	Adder, Subtractor, Shifter, Multiplication and division circuits. Accessing I/O Devices
	Interrupts	Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory access
	Buses	Synchronous Bus, Asynchronous Bus, Interface Circuits
	Standard I/O Interface	Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)
UNIT - IV - The Memory Systems		
Unit	Module	Micro Content
UNIT IV	Main Memory	Basic memory circuits, Memory System Consideration, Read- Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, and Associative Memory.
	Cache Memories	Mapping Functions
		INTERLEAVING
	Secondary Storage	Magnetic Hard Disks, Optical Disks.
UNIT V - Processing unit		
Unit	Module	Micro Content
UNIT V	Fundamental Concepts	Register Transfers, Performing an Arithmetic or Logic Operation, Fetching a Word from Memory
		Execution of Complete Instruction, Hardwired Control
	Micro Programmed Control	Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field.
