

COURSE TITLE : **COMPUTER ARCHITECTURE**
COURSE CODE : **3068**
COURSE CATEGORY : **B**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **72**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Basic Structure of Computers Machine Instructions and Programs	17
	Test I	1
2	Input/output Organization	17
	Test II	1
3	The Memory System	17
	Test III	1
4	Basic Processing Unit	17
	Test IV	1
	Total	72

OBJECTIVES

MODULE I

- 1 Basic Structure of Computers, Machine Instructions and Programs**
- 1.1 Discuss the different Computer Types
 - 1.2 Explain the Functional Units of Computer
 - 1.2.1 Familiarize the Input Units
 - 1.2.2 Understand the functions of Memory unit
 - 1.2.3 Understand the functions of Arithmetic and Logic Unit
 - 1.2.4 Familiarize the Output Units
 - 1.2.5 Control unit
 - 1.3 Explain the Basic Operational Concepts of Computers
 - 1.4 Introduce the Bus Structures
 - 1.5 Evaluate the Performance of Computers
 - 1.5.1 Processor Clock
 - 1.5.2 Basic Performance Equation
 - 1.5.3 Pipelining and Superscalar Operation
 - 1.5.4 Clock Rate
 - 1.5.5 Instruction set: CISC and RISC
 - 1.5.6 Compiler
 - 1.6 Introduce to Multiprocessors and Multicomputers
 - 1.7 Understand the Memory Operations
 - 1.8 Understand Instructions and Instruction Sequencing
 - 1.8.1 Introduce to Instruction Execution and Straight Line Sequencing
 - 1.8.2 Introduce to Branching
 - 1.8.3 Introduce to Condition Codes
 - 1.9 Familiarize Assembly Languages
 - 1.9.1 Introduce to Assembler Directives
 - 1.9.2 Understand Assembly and Execution of Programs
 - 1.9.3 Introduce to Number Notation
 - 1.10 Study the Basic Input/Output Operations

MODULE II

2 Input/output Organization

- 2.1 Understand the Accessing of I/O Devices
- 2.2 Familiarize the Interrupts
- 2.3 Understand Direct Memory Access
- 2.4 Introduce different Buses
 - 2.4.1 Synchronous Bus
 - 2.4.2 Asynchronous Bus
- 2.5 Understand Interface Circuits to connect I/O Devices
 - 2.5.1 Parallel Port
 - 2.5.2 Serial Port
- 2.6 Introduce the Standard I/O Interfaces
 - 2.6.1 PCI Bus
 - 2.6.2 SCSI Bus
 - 2.6.3 Universal Serial Bus

MODULE III

3 The Memory System

- 3.1 Learn the Basic Memory Concepts
- 3.2 Introduce different Semi Conductor RAM Memories
 - 3.2.1 Internal Organization of Memory Chips
 - 3.2.2 Static Memories
 - 3.2.3 Asynchronous DRAMS
 - 3.2.4 Synchronous DRAMS
 - 3.2.5 Structure of Large Memories
 - 3.2.6 Memory System Considerations
 - 3.2.7 Rambus Memory
- 3.3 Introduce different Read-Only Memories
 - 3.3.1 ROM
 - 3.3.2 PROM
 - 3.3.3 EPROM
 - 3.3.4 EEPROM
 - 3.3.5 Flash Memory
- 3.4 Introduce Cash Memory Mechanism
- 3.5 Understand the working of Virtual Memories
- 3.6 Explain the working of Secondary Storage Devices
 - 3.6.1 Magnetic Hard Disks
 - 3.6.2 Optical Disks
 - 3.6.3 Magnetic Tape Systems

MODULE IV

4 Basic Processing Unit

- 4.1 Learn the Fundamental Concepts of how Processor execute Instructions
 - 4.1.1 Register Transfer
 - 4.1.2 Performing an Arithmetic or Logic Operation
 - 4.1.3 Fetching a Word from Memory
 - 4.1.4 Storing a Word in Memory
- 4.2 Understand the Execution of a Complete Instruction
 - 4.2.1 Branch Instructions
- 4.3 Study the Multiple Bus Organization
- 4.4 Study the Hardwired Control to generate Control Signals

- 4.5 Study the Micro programmed Control of generating Control Signals
 - 4.5.1 Familiarize Microinstructions
- 4.6 Introduce Pipelining
 - 4.6.1 Basic Concepts
 - 4.6.2 Role of Cache Memory

CONTENT DETAILS

MODULE I Basic Structure of Computers, Machine Instructions and Programs

Computer Types, Functional units, Basic Operational Concepts, Bus Structures, Performance, Multiprocessor and Multicomputers, Memory Operations, Instructions and Instruction Sequencing, Assembly Language, Basic Input/output Operations.

MODULE II Input/output Organization

Accessing I/O Devices, Interrupts, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces

MODULE III The Memory System

Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Cache Memories, Virtual Memories, Secondary Storage.

MODULE IV Basic Processing Unit

Fundamental Concepts, Execution of a Complete Instruction, Multiple Bus Organization, Hardwired Control, Micro programmed Control, Pipelining.

TEXT BOOKS:

1. Computer Organization - Mc Graw Hill fifth edition

Author: Carl Hamachar
Zvonko Vranesic
Safwat Zaky

REFERENCE BOOKS:

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.