Lok Jagruti Kendra University
University with a Difference

Diploma
in
Artificial Intelligence &
Machine Learning

Course Code: 025090402

Computer System Organization

Programme / Branch Name		Diploma in Artificial Intelligence & Machine Learning			
Course Name	Computer System Organization			**Course Code**	025090402
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses   BSC: Basic Science Courses
   ESC: Engineering Science Courses   PCC: Program Core Courses
   OEC: Open Elective Courses   PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	0	3	50	50	-	100

Legends:

   L: Lectures   T: Tutorial   P: Practical
   CCE: Continuous & Comprehensive Evaluation
   SEE (Th):   Semester End Evaluation (Theory)
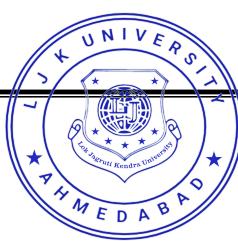   SEE (Pr):   Semester End Evaluation (Practical)

2. Prerequisites

   ✓ Fundamentals of Digital electronics
   ✓ Knowledge of digital circuits and digital components
   ✓ Basics of Computers architecture and I/O peripherals.

3. Rationale

Understand the architecture and organization of digital computer with its various processing units and components, memory organization and input-output peripherals organization.
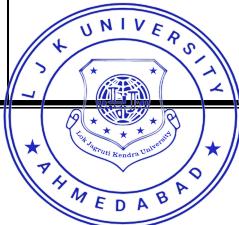
4. Objectives

   ✓ After successful completion of this course the students will be able to
- Understand the basics of digital circuits and digital components of Computer Architecture.
- Acquire knowledge on basic computer organization and design and introduction to advanced processor architecture.
- Understand the different types of memory also explains about the associative memory, cache memory and virtual memory.
- Explain data transfer and Input / Output module.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Organization and Design of Digital Computers**	1.1. Overview of computers and basics of Digital Electronics-Flip Flops 1.2. Registers, Shift Registers 1.3. Register Transfer Notations 1.4. Register Transfer 1.5. Bus Transfer and Memory Transfer 1.6. Arithmetic Micro-Operations 1.7. Logic Micro-Operations 1.8. Shift Micro operations 1.9. Arithmetic Logic Shift Unit	• Deals with digital components, like Flip-flops, and various digital circuits. • Explain registers and register transfers language. • Describe various Arithmetic, Logic and Shift micro-operations. • Understanding Arithmetic Logic Shift Unit - ALU	20	08
2	**Basic Computer Organization**	2.1. Instruction Codes 2.2. Computer Registers - Accumulator, Data Register, Address Register, Program Counter, Memory Data Register, Index register, Memory Buffer Register 2.3. Computer Instructions 2.4. Timing and Control 2.5. Instruction Cycle 2.6. Memory Reference Instructions 2.7. Input-Output and Interrupt 2.8. Complete Computer Description	• Understand various fields of instruction code and list various instruction formats • Inspecting types of registers and understand role of each register • Observing control timing signals diagram for the given instruction • Understanding phases of instruction cycle • Focus on Input-output and interrupt and its working • Observing functional block diagram of BASIC computer	25	09
3	**Central Processing Unit, Pipelining**	3.1. General Register Organization 3.2. Stack Organization 3.3. Instruction Formats 3.4. Addressing Modes 3.5. Data Transfer and manipulation 3.6. Program Control 3.7. CISC – RISC	• Exploring General Register organization. • Focus on various stack organizations of CPU. • Exploring various instruction and instruction format.	25	10

		3.8. Parallel Processing: Flynn's Classification 3.9. Pipeline processing	• Discuss various addressing modes used in computers. • Understanding data transfer and data manipulation instruction. • Discuss program control instructions. • Compare and differentiate RISC and CISC Architecture. • Understanding advantage of pipelining in CPU Design.		
4	**Input/Output Module**	4.1. Input-Output Interface 4.2. Asynchronous Data Transfer 4.3. Strobe Control 4.4. Handshaking 4.5. Asynchronous Serial Transfer 4.6. Modes of Data Transfer 4.7. Input-Output Processor	• Defining I/O interface • Understanding methods of Asynchronous Data transfer • Describe Asynchronous Serial Transfer • Exploring different modes of data transfer • Input Output processor and its organization	15	7
5	**Memory System**	5.1. Memory Units and Classifications 5.2. Memory Hierarchy 5.3. Main Memory 5.4. Auxiliary Memory 5.5. Associative Memory 5.6. Cache Memory 5.7. Virtual memory	• Understand memory hierarchy and memory classification • Understanding concepts of main memory, auxiliary memory, Associative Memory, cache memory and virtual memory	15	8
			Total Hours		**42**

6. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Organization and Design of Digital Computers	35	30	25	-	5	5
2	Basic Computer Organization	30	30	30	-	5	5
3	Central Processing Unit, Pipelining	30	35	25	-	5	5
4	Input/Output Module	35	30	25	-	5	5
5	Memory System	35	25	30	-	5	5

Legends: R: Remembering   U: Understanding
App: Applying   C: Creating
E: Evaluating   An: Analyzing

7. Text Books

1) Computer System Architecture – M. Morris Mano, Latest Edition, Prentice-Hall Inc. publication.

8. Reference Books

1) Computer Architecture – Behrooz Parhami, Latest Edition, Oxford publication.
2) Computer Organization and Architecture Designing for Performance – William Stallings, Latest Edition, Pearson Education.

9. Open Sources (Website, Video, Movie)

1) https://digimat.in/limesurvey/index.php/106105163
2) http://www.cs.iit.edu/~virgil/cs470/Book/