COMPUTER ORGANISATION AND ARCHITECTURE

UNIT CODE: ICT/CU/CS/CR/01/6/B

Relationship to Occupational Standards
This unit addresses the unit of competency: Understand Computer Organization and Architecture

Duration of Unit: 140 hours

Unit description
This unit covers the competencies required to understand computer organisation and architecture. It involves understanding principles of computer organisation and design, understanding central processing unit functions, understanding computer memory organization, understanding input-output functions and understanding computer arithmetic and logic.

Summary of Learning Outcomes

1. Understand principles of Computer Organisation and Design
2. Understand Central Processing Unit functions
3. Understand computer memory organization
4. Understand Input-Output functions
5. Understand computer arithmetic and logic

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Understand principles of computer organisation and design	• Definition of ICT
	• Application areas of ICT
	• Definition of Computer Organisation
	• Description of Computer Architecture
	• Computer Memory Organization
	• Structure and function of computer components
	  ◦ Basic components
	  ◦ Functions of components
	• Identification of computer hardware components
	• Input – Output Organization
		• Practical tests
		• Observation
		• Oral tests
		• Written tests

2. Understand input-output organization	• Peripheral devices
	  • Categories of peripheral devices
	  • Standard I/O devices specification factors
	• Input-output processing
	• Role of Bus interface in I/O
	• Modes of data transfer
	  • Programmed I/O
	  • Interrupt initiated I/O
	  • Direct memory access(DMA)
	• I/O devices' specifications as per user needs
	• Verification of computer I/O devices' specifications
		• Practical tests
		• Observation
		• Oral tests
		• Written tests

3. Understand computer memory organization	• Computer Memory Organization
	  • Functions
	  • Categories of internal memory
	  • Standard memory specification factors
	• Storage technologies
	  • Solid state storage devices
	  • Optical storage devices
	  • Magnetic storage devices
	• Cache and Virtual memory
	  • Definitions
	  • Operations of cache and virtual memory
	• Prescription of memory specifications as per user needs
	• Verification of memory specifications for a given computer
		• Practical tests
		• Observation
		• Oral tests
		• Written tests

4. Understand central processing unit functions	• Central Processing Unit
	  • Types of processors
	  • Processor generations
		• Practical tests
		• Observation
		• Oral tests
		• Written tests

	• Standard CPU specification factors
	• CPU architecture
	  • Arithmetic and Logic Unit
	  • Control Unit
	  • Buses
	• Register
	  • Definition
	  • Types of registers
	• Instruction representation and execution
	  • Instruction set
	  • Fetch Execute Cycle
	• Prescription of CPU specifications as per user needs
	• Verification of computer CPU specifications	

5. Understand computer arithmetic and logic	• Number systems
	  • Types
	  • Operations
	  • Conversion
	• IEEE-based Integer and Floating point representations
	• Integer and Floating point arithmetic
	  • Addition
	  • Subtraction
	  • Multiplication
	• Logic operators
	  • OR
	  • AND
	  • NAND
	  • NOR
	  • NOT
	• Logic operations
	  • Addition
	  • Multiplication
	  • Subtraction
		• Practical tests
		• Observation
		• Oral tests
		• Written tests

	• Division
	• Demonstrating methods of representing logic operations
	  • Truth table
	  • Karnaugh maps
	  • Logic gates	

Suggested Methods of Instruction

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop
- Simulation
- Visiting lecturer/specialist from the ICT sector;
- Industrial visits.

Recommended Resources

Tools

Internet

Equipment

- Computer
- Separate/disassembled hardware components, including
  - CPUs
  - Memory modules
  - Disks
- Peripheral device

Materials and supplies

- Instructional material
- Stationery

Reference materials

- Hardware vendor specifications
- Trainer – recommended resources including web resources