

**19.2.0 MICRO ELECTRONICS**

**19.2.1 Introduction**

This unit is designed to equip the trainee with knowledge, skills and attitudes on computer hardware memories and programming. This module unit is based heavily on Intel 8085 microprocessor. Trainees require basic electronic to improve the understanding of the content of this unit.

**19.2.02 General Objectives**

By the end of the module unit, the trainee should be able to:

- a) understand components of a microcomputer system.
- b) embrace a culture of computer maintenance
- c) discuss evolution of microprocessors
- d) appreciate microcomputer memories
- e) develop computer programs

**19.2.3 Module Unit Summary and Time Allocation**

**Micro Electronics**

<b>Code</b>	<b>Sub-Module Unit</b>	<b>Content</b>	<b>Time</b>
19.2.1	Micro-Processor System	<ul style="list-style-type: none"> <li>• Micro-computer terminologies</li> <li>• Components of computer system</li> </ul>	6
19.2.2	Microprocess or Evolution And Architecture	<ul style="list-style-type: none"> <li>• Microprocessor families and their characteristics</li> <li>• Intel 8085 microprocessor architecture</li> </ul>	10
19.2.3	Microcomput er Memories	<ul style="list-style-type: none"> <li>• Memory terminologies</li> <li>• Construction of primary memories</li> <li>• Memory organization</li> <li>• Backing store memories</li> </ul>	15
19.2.4	Programming	<ul style="list-style-type: none"> <li>• Assembly language program</li> <li>• Hand coding</li> </ul>	24
<b>Total Time</b>			<b>55</b>

**19.2.1 MICRO PROCESSOR SYSTEM (INTEL 8085)**

*Theory*

- 19.2.1T0 *Specific Objectives*  
By the end of the sub-module unit, the trainee should be able to:
- a) define terms applied in microprocessor system
  - b) describe computer system hardware components

*Competence*

- The trainee should have the ability to:
- i) Assemble a computer system
  - ii) Install software
  - iii) Maintain a computer system

*Content*

- 19.2.1T1 Definition of terms
- i) Microprocessor
  - ii) Microprocessor system
  - iii) Hardware
  - iv) software
- 19.2.1T2 Components of a computer system
- i) block diagrams
  - ii) central processing unit
  - iii) I/O ports and devices
  - iv) memory

- v) bus system

*Practice*

- 19.2.1P0 *Specific Objectives*  
By the end of the sub-module unit, the trainee should be able to:
- a) identify parts of a microprocessor system
  - b) assemble a computer system
  - c) install computer system software
  - d) maintain a computer system

*Content*

- 19.2.1P1 Identification of parts of a computer system
- 19.2.1P2 Assembly of a computer system
- 19.2.1P3 Installation of a computer system software
- 19.2.1P4 Computer maintenance

*Suggested Learning Resources*

- i) Computer system
- ii) Computer software

**19.2.2 MICROPROCESSOR EVOLUTION AND ARCHITECTURE**

*Theory*

- 19.2.2T0 *Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) state microprocessor families and their characteristics
- b) describe using block diagrams, the microprocessor architecture of Intel 8085 CPU

*Competence*

The trainee should have the ability to:

- i) Identify and install a CPU in a computer system

*Content*

19.2.2T1 Statement of microprocessor families and their characteristics

- i) Intel corporation
- ii) 8085,8080,8086, 8088
- iii) Pentium I, II, III, IV
- iv) Zilog corporation
- v) Z80
- vi) Motorola
- vii) MC6800

19.2.2T2 Description of Microprocessor architecture of Intel 8085 CPU

- i) pin description diagram
- ii) internal structure
- iii) register section
- iv) Arithmetic and Logic Unit (ALU)

- v) Instruction and decode unit

*Practice*

19.2.2P0 *Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) identify a microprocessor in a computer system
- b) identify pins in a microprocessor chip

*Content*

19.2.2P1 Identification of a microprocessor

- i) Physical location

19.2.2P2 Microprocessor pin description

- i) Pin layout

*Suggested teaching and learning resources*

- i) Various types of computer processing units
- ii) Computers

**19.2.3 MICROCOMPUTER MEMORIES**

*Theory*

19.2.3T0 *Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) define terminologies used in memories

- b) describe the construction and operation of primary memory
- c) explain computer memory organization
- d) describe the operation of various backing store memory devices

- v) Hard disc
- vi) Floppy diskettes
- vii) Bubble memories
- viii) Charge Coupled Devices (CCD)
- ix) Compact Discs (CD)
- x) Digital Versatile Disc (DVD)
- xi) Flash disks

*Competence*

The trainee should have the ability to:

- i) Expand computer memory
- ii) Use backing store memory

*Practice*

- 19.2.3P0 *Specific Objectives*  
By the end of the sub-module unit, the trainee should be able to:
- a) expand a computer memory
  - b) store and retrieve data in various backing store memory devices

*Content*

- 19.2.3T1 Definition of terms in memory
- 19.2.3T2 Construction and operation of primary memory
  - i) Random Access Memory (RAM)
  - ii) Read Only Memory (ROM)
- 19.2.3T3 Computer memory organisation
  - i) memory mapping
  - ii) chip organisation
- 19.2.3T4 Description of various backing store memory devices
  - i) Need for backing store
  - ii) Magnetic tapes
  - iii) Magnetic cassettes
  - iv) Magnetic disc

*Content*

- 19.2.3P1 computer memory expansion
  - RAM expansion
- 19.2.3P2 Storage and retrieval of data in various backing store memory devices

*Suggested Assessment Methods*

- i) RAM memory chips
- ii) Computer system
- iii) Backing store memory devices

**19.2.4 PROGRAMMING**

*Theory*

- 19.2.4T0 *Specific Objectives*  
 By the end of the sub-module unit, the trainee should be able to:
- a) write short programs on assembly language
  - b) hand code a given program to hexadecimal code

*Competence*

The trainee should have the ability to:

- i) write programs in assembly language
- ii) run programs in microprocessor systems

*Content*

- 19.2.4T1 Assembly language program
- i) Data transfer
  - ii) Data manipulation
  - iii) Transfer of control
  - iv) Input/output instruction
  - v) Machine control
- 19.2.4T2 Hand coding
- i) 8085 instruction set
  - ii) machine code

*Practice*

- 19.2.4P0 *Specific Objectives*  
 By the end of the sub-module unit, the trainee should be able to:
- a) safety cable and power the microprocessor kit

- b) enter a program in 8085 microprocessor kit
- c) run a program in 8085 micro processor kit

*Content*

- 19.2.4P1 Setting up an 8085 microprocessor kit
- 19.2.4P2 Entering of a program into 8085 microprocessor kit
- i) Address field
  - ii) Data field
  - iii) Hexadecimal keys
  - iv) Function keys
- 19.2.4P3 Running a program in 8085 micro processor kit
- Function keys

*Suggested Learning Resources*

- i) Intel 8085 instruction set
- ii) Intel 8085 microprocessor kit