

14.1 Electronics Components and PC Hardware (CHM - A1- R0)

Objective of the Course

This course has been designed to provide an introduction to the basic electronic components that go into making of a computer system. The course covers the various tools available for diagnosing an electronic circuits and component testing. Digital circuits, which are the basic building blocks of a computer, are also introduced in this module.

Outline of the Course

Sl. No.	Topic	Min. no. of Hours
1.	Introduction to Computers	04
2.	Electronic Components: Active and Passive Components	16
3.	Circuit Analysis	04
4.	Connectors, Relays, Switches and Panel Components	04
5.	Digital and Integrated Circuits	10
6.	Semiconductor Memories	02
7.	Power Supplies	08
8.	Tools and Aids for Maintenance	06
9.	Types of PCB's and Soldering Techniques	04
10.	Do's and Don'ts of PC Maintenance	02
	Lectures	= 60 Hrs.
	Practicals	= 60 Hrs.
	Total	= 120 Hrs.

4.1.1 Detailed Syllabus

1. Introduction to Computers 04 Hrs.

1.1 Basic building blocks of a computer system - the CPU, the Arithmetic & Logical Unit. The binary numbers as a language which computer understands, Interprets and processes. The Input & Output devices as means of communication with a computer system.

1.2 Concept of hardware & software - Two main components of a computer system. Definition of data and information. Importance of information flow & its impact on growth & productivity.

1.3 Computer as an Electronic Machine - The need for study of Electronics & Electronic components for understanding the working of a Computer & Peripherals such as Keyboard, Mouse etc. from hardware point of view.

2. Electronic Components: Active and Passive Components 16Hrs.

2.1. Passive components: Resistor, Capacitor & Inductor 08 Hrs.

Resistor:

Standardization, color codes, power rating specifications and properties of fixed and variable resistors. Specifications and properties of thermistors.

Capacitor:

Introduction, standardization, and colour codes characteristics of capacitor tolerance, temperature coefficient, type of capacitors and their applications.

Inductor :

Introduction to magnetic materials and their properties, inductor, characteristics, types of inductors, their features and specifications, transformers, types of transformers.

2. 2. Active Components 08 Hrs.

Introduction to Diodes, their characteristics and applications, Zener diodes and their characteristics and impedance, introduction to Bipolar transistors and their applications, functions, specification, testing of Diodes and Transistors. Introduction to operational amplifiers (OP AMPS) and simple circuits

3. Circuit Analysis 04 Hrs.

Fundamentals of AC and its application to circuit theory, energy and power in AC. Simple RC, RL, LC & RLC circuit and filters.

4. Connectors, Relays, Switches And Panel Components 4 Hrs.

Introduction to relays, their characteristics, classifications, performance during pick up and drop out, introduction to connectors and switches, different types and their applications, panel components. Introduction to various transformers used in SMPS and Peripherals.

5. Digital and Integrated Circuits 10Hrs.

Introduction to logic levels & gates, Latches, unidirectional & bi-directional buffers, tristate devices, Clock generators, Flip-flops, Registers, Counters, Multiplexers & Demultiplexers. Introduction to various logic families and their characteristic, Bipolar Logic Family, Unipolar Logic Family – PMOS, NMOS, CMOS. Characteristics of Digital IC's. Comparison of Digital Logic Families. Latest trends in packaging.

