

Computer Hardware

1. **Name:** Computer Hardware
2. **Sector:** Information & Communication Technology (ICT)
3. **Code:** ICT205
4. **Entry Qualification:** Minimum 10th Std. & 14 years and Above &
 - MES Module on Computer Fundamentals, MS-Office, Internet & Soft Skills
5. **Terminal Competency:** After completion of the training, participants would be able to:
 - Assembling computers & installing the peripheral devices
 - Repair computers up to card level.
 - Install different software on computers
6. **Duration:** 180 hrs.
7. **Contents:** Given below:

Practical Competencies	Underpinning Knowledge (Theory)
<ul style="list-style-type: none"> • Identification and using different input-output devices ,cords, cables,connectors and input-output devices. 	<ul style="list-style-type: none"> • <u>Computer Basics</u> • Block Diagram of a Computer System.
<ul style="list-style-type: none"> • Practice of using Keyboard and mouse. • Booting computer in DOS and Windows environment. • Identifying different error messages. 	<ul style="list-style-type: none"> • <u>Storage Devices</u> - Magnetic tape, Floppy Disk, Hard Disk & CD ROM. • Booting the computer • Storage & retrieval of data • Types of software System software & Application software. Functions of operating system, interpreter compiler and_assembler
<ul style="list-style-type: none"> • Identifying and Practising all the hardware tools. • Using FDD & CD Lens cleaning kits. Using cleaning solutions like isopropyl alcohol & carbon tetra chloride. • Using all the relevant tools. Soldering and de-soldering. • Hands-on practice of using the utility programs. • Using hardware-troubleshooting software. 	<ul style="list-style-type: none"> • <u>Basic Tools (Hardware & Software)</u> • Straight slot screwdrivers,. Phillips & Torx screwdrivers, Hex nut driver, combination pliers, nose-pliers, chip inserters and extractors, flash light, tweezers, wire cutter and stripper, soldering iron, de-soldering pump, vacuum cleaner, brush ,crimping tool etc. • FDD cleaning kits, CD drives lens cleaning kit, isopropyl alcohol, etc. • DOS & Windows bootable, FDISK, FORMAT, SYS, SCAN DISK, MSD, MSCDEX, Disk Manager, Norton Utilities, DOS & Windows installable, hardware troubleshooting software.
<ul style="list-style-type: none"> • Identification (type, value, package, polarity) and testing of resistors, capacitors, diodes, transistors/ • Study of suitability of place for computer installation and preparing the site as per specification. 	<ul style="list-style-type: none"> • Basic electronic components. • Significance of current, voltage, power, resistance and capacitance. Principle of resistors, capacitors, diode, zener diode, LEDs and transistors. • Site Preparation. • Layout of PCs, printers etc., Air-conditioning requirements, Power supply requirements & layout, false roofing, flooring, Line-conditioning equipment and positioning of exhaust fans

<p>To identify different Motherboards, Controller Cards, Display cards and Sound cards, AGPs, Fax/Modem card, TV Tuner card, Ethernet card</p>	<ul style="list-style-type: none"> • Types of cards used in computer system. Motherboards, Controller Cards, Display cards and Sound cards, AGPs, Fax/Modem card, TV Tuner card, Ethernet card
<ul style="list-style-type: none"> • Identification of different processors, their pins. Testing and replacing the processors. Understanding coding on the processors 	<ul style="list-style-type: none"> • Types of Interfaces/Connectors. • FDD connectors, IDE & SCSI Interface, Serial (COM) ports, Parallel (LPT) ports, USB connector, Keyboard and PS/2 connectors. • Types of Processors. • Main features, package, voltage, clock speed, Study of different types of Pentium processors.
<ul style="list-style-type: none"> • Installing and upgrading memory. Identification of memory slots and memory chips. Testing the memory slots and chips 	<ul style="list-style-type: none"> • Types of Memory. • Different types of Memory used in PCs. Installing and upgrading memory. L1 and L2 cache memory
<ul style="list-style-type: none"> • Checking and replacing motherboards. Installing CPU and memory on Motherboards. Checking and replacing BIOS and Battery. 	<ul style="list-style-type: none"> • Motherboard (Installation, Configuration & Troubleshooting) • Types of Motherboards, Motherboards with different sockets and slots. Jumper settings, DIP switch settings. Installing the processors and memory on MB. Checking MB BIOS. Checking and connecting external battery. On-board features. Installing, checking and replacing Motherboards.
<ul style="list-style-type: none"> • Checking the fuse, checking output voltage, connecting to Motherboard and other devices. Installing and replacing the power supply. • Installation of Display cards, Super IDE card, SCSI card etc. Installation and configuration of Sound card, Modem, TV tuner card and Ethernet card. Checking and configuring ports. 	<ul style="list-style-type: none"> • Power Supply (Installation & Troubleshooting) • Different types of SMPS (AT & ATX), • <i>Expansion cards (Installation, configuration & troubleshooting).</i> • Study of different types of Cards.
<ul style="list-style-type: none"> • Installing and connecting the HDD, configuring as master and slave. • Using software tools like Scandisk, FDISK, Norton Utilities, Disk Manager etc. to partition, format surface scan and to mark the bad blocks. Low-level formatting. • Connecting and configuring drives, checking. and replacing cables, cleaning the heads, changing the sensors, identifying and rectifying floppy drive problems 	<ul style="list-style-type: none"> • <u>Hard Disk drives (Installation and configuration).</u> • Types of HDD (IDE & SCSI), Installing and connecting HDD, configuring HDD as master and slave, checking media, partitioning, formatting and making HDD bootable. • <u>Floppy Drives (Installation and Maintenance).</u> • Types of FDDs, connections of floppy drives, cleaning drive heads.
<ul style="list-style-type: none"> • Installing and loading the drivers. Configuring as master and slaves. Cleaning lens of CD Drives writer, DVDs and cleaning head of CTDs. • Hands-on practice of checking and replacing the keyboard cable and KB switches. Servicing the keyboard. • Configuring and optimizing the CMOS set-up. 	<ul style="list-style-type: none"> • <u>CD ROM Drive, DVD & CTD (Installation and Maintenance)</u> • Types of CD Drives, DVDs, data storage and retrieval on CDs, DVDs & CTDs. Connecting and configuring the drives. Maintenance of CDs, DVDs & CTDs. Installation and working of CD Writer • <u>Keyboard servicing and CMOS Setup</u> • Types and working of keyboards. Checking and replacing the keyboard cable and KB switches. Servicing the keyboard.

<ul style="list-style-type: none"> • Servicing of monitors, changing fuses, adjusting colors, brightness and contrast. Setting resolution, loading drivers. Checking and replacing components on the PCB. Checking and adjusting LCD Monitors. • Configuring and servicing the printers, Self-test, checking printer cables and ports. Loading the drivers and managing the output. 	<ul style="list-style-type: none"> • <u>Monitors (Servicing & Maintenance).</u> • Types of monitors (Mono & Color), Block diagram, CRT, checking the fuses, Adjusting contrast and brightness. LCD Monitors. • <u>Printers (Troubleshooting & Maintenance)</u> • Types and working of different printers (DMP, DeskJet and LaserJet). Checking the interface and cables, setting the DIP switches, self test & servicing the printers. Loading the drivers.
<ul style="list-style-type: none"> • Installation of DOS & Windows operating systems. Loading and configuring the device drivers. Identifying viruses and using anti-virus programmes to scan and remove different type of viruses <ul style="list-style-type: none"> • Identify components of a simple LAN environment, to identify different types of cables used for networking, to Identify the protocols installed in an existing LAN setup, m, Identify the NIC installed & MAC address, installation of NIC card. • Make UTP cross cable and testing using continuity tester. Establish connection between two computers using a cross cable • Make a UTP straight patch cord and testing using continuity tester. Connect and test a straight cable using a N-port switch and computers. Establish a peer-to-peer connection. Configure a router Add/ Delete entries in configuration task. Create work groups. • Set IP address and subnet mask. Establish connection. Use of Ping command. Establish sub networks using subnet mask. Share resources in LAN. Fault find and troubleshoot network problems 	<ul style="list-style-type: none"> • <u>Assembling & Dismantling of PCs and Front panel connections.</u> • <u>Software Installation & Virus Protection</u> • Installation and configuration of DOS and Windows operating systems. Installation of Device drivers. Types of viruses, their symptoms, identification, protection and removal. • Serial data communication, principle, standards /protocols and devices/ applications. • Parallel data communication, principle, standards/protocols and devices/ applications. • Features of Networked computers, Components required for networking, Network Topologies. Comparison. Network Protocols, applications, Physical components planning for a small LAN. • Network operating systems and features. • Network cables, types, specifications, standards, application. Peer – to – peer connection. Client –server connection, comparison, applications. • What is router, its function, configuration table, Concept of work groups and uses. UTP Cross cable for testing connection between two computers
<ul style="list-style-type: none"> • Making of preventive maintenance plan, taking backups using MSBACKUP and other third party tools. Fine-tuning and optimizing the system. 	<ul style="list-style-type: none"> • <u>Preventive Maintenance.</u> • Cleaning the equipment, servicing the equipment, Types of Backup, taking backups and fine-tuning the system,

Tools & Equipment

Hardware:

- Multimedia Computer System with internal Modem
- External Modem
- Laser Printer
- Desk Jet Printer
- Dot Matrix Printer 132 Cols.
- CD Writer (1 – Internal; 1 – External)
- Computer repairing tool kits
- Vacuum Cleaner (small size)
- Soldering Station
- Spare Motherboards, Processor & Memory Modules
- Expansion Cards used in computers (SCSI, TV Tuner, Ethernet)
- Networking tools such as Hub, Switch, Modem, Router, crimping tool, etc

Software:

- Microsoft Windows 2000 (Professional) or Linux OS Latest
- Microsoft Windows XP or any other Word Processor software
- MS DOS (Ver. 6.2 or latest)
- Windows 2003 Server.
- Antivirus Software (Popular Brand)
- Norton Utilities
- Hardware Diagnostics software (Advanced MS Diag. / QA Plus)

Material

- FDD Head –cleaning kits
- CD Lens cleaning kits
- Carbon tetra chloride
- Isopropyl alcohol