

Section-I: Detailed Curriculum

Module-I: Basics of Computer Hardware

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
1. Power Supplies	10	20	After completion of this unit of module, the Learner will be able to <ul style="list-style-type: none"> ● Know Basic Principles of Power Supplies. ● Get familiar with Connectors of power supply. ● Well Versed in Assembling, Installation, Fault Analysis and Troubleshooting of Power Supply.
2. Mother Board	15	20	After completion of this unit of module, the Learner will be able to <ul style="list-style-type: none"> ● Get familiar with various types of motherboard used in computers. ● Acquire knowledge of Motherboard basics. ● Well versed in practical identification of Mother Board-CPU Socket, Integrated Peripherals, Card Slots, CPU Fan Connector, and other components attached to Mother Board.
3. Chipset	5	10	After completion of this unit of module, the Learner will be able to <ul style="list-style-type: none"> ● Know working of Chipset. ● Physically Identify and various chipset available and technology advancement. ● Knowledge of chipset slot and socket
4. Primary and Secondary Memories	10	15	After completion of this unit of module, the Learner will be able to <ul style="list-style-type: none"> ● Get familiar with Memories and their types. ● Physical Identification of Primary and Secondary Memories.

			<ul style="list-style-type: none"> • Learn about Virtual Memories, USB Flash Drive, DVD, CD etc.
5. Buses & I/O Ports	5	10	<p>After completion of this unit of module, the Learner will be able to</p> <ul style="list-style-type: none"> • Identify various connecting ports used in desktop/laptop • Physically identify types of Ports and Buses on the Motherboard.

Detailed Syllabus

(i) Power Supplies

Study and Application of Capacitor, Resistance, Diode, Zener Diode, Transistor, MOSFET, Introduction to Operation Amplifier IC 741 and its application as Comparators, Basic Principles and Operation of Power Supplies - Unregulated, Regulated, Linearly Regulated, Switched, Split Power Supply, Switching Supply and its Comparison w.r.t. Size, Weight, Input Voltage and Current Range and Output Voltage, Efficiency, Circuit Complexity, Applications and Cost, Power Supply Assembling and Installation, Flow Chart Preparation for Fault and Troubleshooting of Power Supply, Introduction to Power Supply Filter and Heat Sink

(ii) Motherboard

Motherboard Definition, Study of Motherboard Form Factor – ATX, Micro-ATX, Flex ATX, ITX and Mini-ITX, Processor Socket Definition, Processor Slots Definition, its Type – Ball-Grid Array and Pin Grid Array, Study of Motherboard Components – I/O Chip, ROM BIOS, Single In Line Memory Module, Dual In Line Memory Module, Rambus In Line Memory Module (SIMM/DIMM/RIMM) Sockets, Instruction Set Architecture (ISA)/Peripheral Component Interconnect (PCI)/Accelerated Graphics Port (AGP) Bus Slots, CMOS Battery, Study of Motherboard Integrated Connectors – Audio, Video, Network Interface Card (NIC), Small Computer System Interface (SCSI), Audio Modem Raiser (AMR), Communication and Networking Raiser (CNR)

(iii) Chipset

Chipset Definition, Study of Northbridge and Southbridge Chipset Architecture, Study of Intel Chipset for Processor Socket LGA2066 and LGA1200, Study of AMD Chipset for Processor Socket SP3r2 and SP3r3.

(iv) Primary and Secondary Memories

Basic Principle and Operation of Memory, How Data Organization and Representation is done in Memories, Comparison between Volatile and Non-Volatile Memories and its Examples, Definition of Primary Memory and Secondary Memory, Working of RAM, ROM, Processor Register, Processor Cache, Virtual Memory, DDR2,DDR3,EPROM,EEPROM and Video Memory

Secondary Memory – Working of HDD, SSD, SSHD, Optical Storage - Blue Ray, DVD, CD.

(v) Buses & I/O Ports

Bus Definition, System and I/O Bus, its Types, Operation and Applications, Port Definition, Operations, Applications and its types - External and Internal Ports, Operation and Application of Parallel (LPT) and Serial Port (COM), Operation and Applications of Address, Data and Control Bus,

Reference Books/Study Material

1. Book Title : Upgrading and Repairing PCs
Author : Scott Mueller
Edition : 22nd Edition
Publisher : Que

2. Book Title : Modern Computer Hardware Course
Author : Lotia Manahar
Publisher : B P B Publications

3. Book Title : Computer Hardware
Author : Hing Lown
Publisher : Independently Published (Copy Right Material of Author)

4. Book Title : Computer Hardware and Troubleshooting Lab Guide: (Understand, Repair, Upgrade and do troubleshooting your computer (PC's) yourselves)
Author : G. Ganesh Shashidhar
Publisher : Independently Published (Copy Right Material of Author)

Module Unit	Duration * (Theory) in Hours	Duration *(Practical) in Hours	Learning Objectives
1. Mouse, Key Board, Printers	10	25	After completing this unit, Learner will be able to <ul style="list-style-type: none"> • Know the types of Peripheral Devices. • Know the Working of Peripherals Devices and application. • Well versed in troubleshooting and identification of Components- Printers, Mouse, Keyboards.
2. Display Devices and Data Storage Devices	15	25	After completing this unit, learner will be able to <ul style="list-style-type: none"> • Learn Various Display types and its operation. • Understand working of LED , LCD, TFT. Plasma, Quantum Dot Flexible and Rollable Display. • Online Data Storage • Offline Data Storage
3. System Diagnostic Tools	20	25	After Completion of this unit learner will be able to learn <ul style="list-style-type: none"> • How to trouble shoot Computer hardware problems through software diagnostic tools • Identification of faulty components and finally its rectification.

*Duration may change based upon delivery of contents

Detailed Syllabus

(i) Mouse, Key Board, Printers

Study of Basic Principle, Construction and Operation of wired and wireless Optical Mouse, wired and wireless Keyboard, Study of Printers types, principle, Construction, Operation and Application of Impact Printers – Dot Matrix and Line Printers, Non Impact Printers - Inkjet, Laser and Multi-Function Printers.

(ii) Display Devices & Data Storage Devices

Display types and Operations of Electroluminescent Display, Electronic Paper Display, LED Display, LCD Display, TFT LCD Display, Plasma Display, Quantum Dot Display, Flexible Display and Rollable Display. Data Storage Devices features - Volatility, Accessibility, Mutability and

Addressability Online Data Storage – Cloud Storage – Google Drive, Flickr and Microsoft Sky Drive, Offline Data Storage – RAID, USB Flash Drive, Memory Card and Memory Stick.

(iii) System Diagnostic Tools

Diagnostic Tools Definition, Application of Windows OS Diagnostic Tools for Task Scheduler, Event Viewer, Shared Folder, Disk Management Services, Memory Diagnostic, Windows Defender, Windows OS Diagnostic Command for Resource, Performance and Memory – perfmon, perfmon /report and mdsched, Linux OS Diagnostic Command – htop, vmstat, iotop ,lscpu, hwinfo, lspci, lsscsi, lsusb, lsblk, fdisk and free.

Reference Books/Study Material

1. Book Title : Upgrading and Repairing PCs
 Author : Scott Mueller
 Edition : 22nd Edition
 Publisher : Que

2. Book Title : Modern Computer Hardware Course
 Author : Lotia Manahar
 Publisher : B P B Publications

3. Book Title : Computer Hardware
 Author : Hing Lown
 Publisher : Independently Published (Copy Right Material of Author)

4. Book Title : Computer Hardware and Troubleshooting Lab Guide: (Understand, Repair, Upgrade and do troubleshooting your computer (PC's) yourselves)
 Author : G. Ganesh Shashidhar
 Publisher : Independently Published (Copy Right Material of Author)

4. Book Title : Personality Development and Soft Skill
 Author : Barun K. Mitra
 Publisher : Oxford University Press, 2nd Edition

Module-III: Syllabus of Computer Networking and Hardware

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
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1. Network Hardware Devices	15	30	After completion of this unit of module, Learner will be able to <ul style="list-style-type: none"> • Understand the Computer Networking Hardware Devices • Practically use Networking Devices
2. Internet	20	20	After completion of this unit of module, Learner will be able to <ul style="list-style-type: none"> • Understand the Internet Architecture • Understand OSI, TCP/IP • Understand Network Topology • Understand WWW and it's working.
3. Bluetooth and Wireless Networking	5	15	After completion of this unit of module, Learner will be able to <ul style="list-style-type: none"> • Understand Bluetooth Architecture – PICONET and SCATTEMET • Bluetooth Layers • Establish Bluetooth Personal Area Network its operation and applications. • WLAN its types and Architecture
4. Networking Diagnostic Tools	5	10	After completion of this unit of module, candidate will be able to <ul style="list-style-type: none"> • Run Network Diagnostic Command • Run Network Diagnostic Software • Able to troubleshoot Network problems

Detailed Syllabus

(i) Network Hardware Devices

Introduction to Data Communication and Simplex, Half Duplex and Full Duplex Communication, Operation and Applications of Copper Wire, Aluminium Wire, Core Cable Wire (DC or Single Phase AC) and 4 Core Wire (3 Phase AC), Wires Gauge and Labelling, Operation and Application of Cables - Twisted Pair (Shielded and Non Shielded), Coaxial Cable (Thicknet and Thinnnet), Optical Fiber Cables (Single and Multi Mode), Operation and Application of Network Hardware Devices - NIC Card, Hub, Switches, Routers, Access Point, Modem and Gateway, Trouble shooting Fault Tree for Network Hardware Devices.

(ii) Internet

Definition Architecture and Working of Internet, World Wide Web (www), Internet Service Provider (ISP), Introduction of OSI and TCP/IP Model, TCP/IP, Detail Study of Network Application Layer – Architecture (Client-Server and Peer to Peer), Functions (Identifying Communication Partners, Determining Resource Availability, Synchronizing Communication), Services of Application Layer (NVT, FTAM, Addressing, Mail Services, Directory Services) Protocols in Application Layers (Telnet, FTP, TFTP, NFS, SMTP, LPD, X Windows, SNMP, DNS and DHCP with Command Practice), Detail Study of, IPv4, IPv6, IP Addressing and Subnetting in IPv4 and IPv6, Network Topology, Trouble shooting Fault Tree for Internet Connectivity.

(iii) Bluetooth and Wireless Networking

Introduction, Bluetooth Topology (PICONET, SCATTERNET), Bluetooth Architecture - Radio, Baseband, Link Management Protocol (LMP), Blue Tooth Low Energy (BLE) Definition – BLE Devices, BLE Architecture, BLE Protocol Stack and BLE Applications, WLAN Introduction, WLAN Architecture, WLAN types – WLAN, WMAN, WPAN, WWAN, WLAN Topologies – Adhoc, Infrastructure, RF, 802.11g, 802.11a, 802.11h, WLAN Benefits.

(iv) Networking Diagnostic Tools

Diagnostic Command - ping, tracert/traceroute, ipconfig/ifconfig, nslookup, netstat, Diagnostic Command for Linux - Windows Network Diagnostic Software Tool - PuTTY/Tera Term, Subnet Calculator, IP Calculator, Speed test.net Scope and Modules.

Reference Books/Study

1. Book Title : Computer Network and Data Communications: Guide Question and Answer
Author : Prof. Satish Jain
Publisher : B P B Publication
2. Book Title : Computer Network
Author : Suresh Fatehpuria, Dimple Jayaswal
Publisher : Genius
3. Book Title : Internetworking Technology: An Engineering Perspective
Author : Rahul Banerjee
Publisher : Prentice Hall
4. Book Title : Fundamental of Wireless Communication
Author : David Tse and Pramod Viswanath
Publisher : Cambridge University Press)

Module-IV: Working and Maintenance of Systems

Module Unit	Duration (Theory) in Hours	Duration (Practical) in Hours	Learning Objectives
1. Computer Hierarchy	5	10	<p>After completion of this unit of module, Learner will be able to</p> <ul style="list-style-type: none"> • Understand Digital Electronics, Number System, Sequential and Combinational Circuits • Understand different types of computers • Understand types of OS, Application Software and its Installation.
2. Processor	10	15	<p>After completing this unit, Learner will be able to</p> <ul style="list-style-type: none"> • Identify Processors for Workstation, Midrange, Mainframe and Supercomputer. • Know Indian made super computer – Pratyush and Mihir • Understand in -depth working of processor and comparison of processor based on Clock Speed, Cache etc.
3. Laptop	15	20	<p>After completing this unit, Learner will be able to</p> <ul style="list-style-type: none"> • Understand internal operation of Laptop and its Architecture, • Understand Hard and Soft Starting Process, • Understand detail ACPI Specification • Battery Charging Circuits,
4. BIOS, Booting and POST Test	5	10	<p>After completing this unit, Learner will be able to understand</p> <ul style="list-style-type: none"> • BIOS definition, Starting BIOS, BIOS Setup - CPU Configuration. • Working of BIOS Setup, SATA Configuration and Hardware. Health Configuration. • BIOS and Booting Process, Security, POST Test Process

5. OS and Application Software	5	10	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> ● Definition and Architecture - Operating system(OS) ● Well Versed in installation of Ubuntu and Windows OS.
6. Virus Removal and Protection	5	10	After completing this unit, Learner will be able to understand <ul style="list-style-type: none"> ● Computer Virus ● Virus Types and its removal ● Installation of Anti Virus Software. ● Virus Infected Identification of Computers.

Detailed Syllabus

(i) Computer Hierarchy

Digital Computers - Number Systems, Binary, BCD, Hexadecimal, Grey and its conversion, Study of Logic Gates and Truth-Table, Combinational Circuit Examples - 1-Bit Half Adder, 1-Bit Subtraction, 2:1 MUX, 1:2 DEMUX Simple Clock Signal, Sequential Circuits Examples – SR Latch and SR Flip Flop, Study of Types, Operation and Application of WorkStation, Midrange Computer, Mainframe Computer and Super Computer, operating system and application software.

(ii) Processor

Study of Specification, Electrical Properties and Application of Intel i7 Processor for Workstation, Intel i9 10980XE, AMD Ryzen3, AMD Ryzen5 Processors for Midrange Computer, Introduction to Indian Processor and its Applications – Shakti and Vega, Main and System Assistance Processor (SAP) for Mainframe Computer, Cray XC400 Parallel Multiprocessor Supercomputer, Introduction to Indian Super Computer and its Applications – Pratyush and Mihir.

(iii) Laptop

Introduction to Laptop and its Architecture, Hard and Soft Starting Process, ACPI Specification and G(Global), D(Device), S(Sleeping) and C State of ACPI, Power and Control Signal of ACPI, Clock and Reset Circuits, Battery Charging Circuits, Fault Tree for Common Errors and Failure

(iv) BIOS Booting and POST Test

Firmware Introduction and its Examples, BIOS, UEFI and its Comparison, Starting BIOS, BIOS Setup - CPU Configuration, SATA Configuration, USM Configuration, On Board Device Configuration, Power Management Configuration, Hardware Health Configuration, BIOS and Booting Process,

Security, POST Test Process, AMI Beep Codes, Phoenix Beep Codes, Fault Tree for Common Error and Messages

(v) OS Application

Definition and Architecture -Operating system (OS), Single, Multi-Tasking OS, Distributed OS, Embedded OS and Real Time OS, Installation of Ubuntu and Windows OS, Definition and Architecture of Application Software, Installation of Free ware Application Software from Ubuntu OS and Proprietary Application Software Installation from Windows OS, Fault Tree for Common Error and Messages.

(vi) Virus Removal and Protection

Computer Virus Introduction, Virus Types – Malware, Trojan, Horse Worm, Spyware and Adware, Common Virus Signs – Popup Window Coming, Program Self Executing, Frequent Accounts Logout, Device Crashing, Mass Email, Steps for Virus Removal – Trusted Antivirus Software, Non Clicking of unknown Popup Window, Email Scanning, File Scanning, Antivirus Software – Norton, AVG and Quick Heal Installation and Virus Protection.

Recommended Books/Study Material

1. Book Title : Upgrading and Repairing PCs
Author : Scott Mueller
Edition : 22nd Edition
Publisher : Que
ISBN-13 : 978-0789756107
ISBN-10 : 9780789756107

2. Book Title : Modern Computer Hardware Course
Author : Lotia Manahar
Publisher : B P B Publications
ISBN No. : 9788183331678, 818333167X

3. Book Title : Computer Hardware
Author : Hing Lown
Publisher : Independently Published (Copy Right Material of
Author)
ISBN No. : 9781718124493

4. Book Title : Computer Hardware and Troubleshooting Lab Guide:
(Understand, Repair, Upgrade and do troubleshooting
your
Computer (PC's) yourselves)
Author : G. Ganesh Shashidhar
Publisher : Independently Published (Copy Right Material of
Author)
ISBN No. : 1983336319, 9781983336317

Employability Skills* : 60 hrs

- Introduction to Employability Skills
- Career Development & Goal Setting
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Financial and Legal Literacy
- Entrepreneurship
- Diversity & Inclusion
- Constitutional values - Citizenship
- Essential Digital Skill

Employability skills would be divided in all four modules.

OJT: 60 Hrs

Section-II: Hardware and Software requirement

Hardware Requirement

Table1: Hardware Requirement	
S.NO.	List of Computer Hardware Component and Trainer Kit
1	Desk Top Trainer Kit
2	Laptop Trainer Kit
3	Keyboard, Wireless Keyboard, Optical Mouse Trainer Kit
4	Dot Matrix Printer Trainer Kit
5	Ink-Jet Printer trainer Kit

6	Laser Printer Trainer Kit
7	ALL-In-One MFD (Multi Function Device) Trainer Kit
8	Hub, Bridge, Switch, Router, Gateway Trainer Kit
9	Computer Network Cables Display Board
10	Function Generator
11	Bread Board and Power Supply
12	Variable Power Supply (0-15Volt, 2Amp)
13	Transformer Input-230V, 50Hzs, Output 9-0-9Volt
14	IC 741, IC7805, IC7404, IC7408, IC7432, IC7486, IC7400, IC74LS02, IC74266, IC74153, IC74139, IC74LS669, IC74LS194
15	Digital Multi-Meter
16	Soldering Station
17	Electronic Tool Kit Set
18	Digital Oscilloscope

Software Requirement

Table2: Software Requirement	
S. No.	List of Software's
01	Linux OS – Ubuntu (Desk Top and Server)
02	PC Diagnostic Software – PC Doctor
03	Microsoft Windows Server – Latest Edition Windows 2000 Onwards
04	Microsoft OS – Latest Edition Windows 10 Onwards

Section:III: Faculty Requirement

- The institute shall have at least three full time faculty members, who are with the institute for not less than six months.
- Faculty shall possess qualification and experience specified for each level (Refer Table below)
- Out of three full time faculty, one faculty may be a support faculty with the specified qualifications and experience (Refer Table below)
- The institute is required to provide the proof in respect of the faculty requirements mentioned above along with the application. (Bio-data of the faculties may be submitted along with the application)

Faculty Qualification & Experience Requirement:

LEVEL S	COMPETENT FACULTY		SUPPORTING FACULTY		RATIO OF FULL TIME TO PART TIME FACULTY	RATIO OF FULL TIME + PART TIME FACULTY TO STUDENTS
	QUALIFICATION	EXPERIENCE	QUALIFICATION	EXPERIENCE		
'CHM T -O'	Graduate with Diploma or Equivalent (Govt. recognized) in Electronics/ Computers or 'CHM-A' level	Minimum 2 years experience	Diploma in Electronics/ computers (Govt. Recognised) or Equivalent	Minimum one-year relevant experience.	Shall be better than 3:1	Shall be better than 1:25