



**अखिल भारतीय सूचना प्रौद्योगिकी संगठन**  
**All India Information Technology Association**  
**New Delhi**

WORK RELATED TO MINISTRY OF INFORMATION TECHNOLOGY (GOVT. OF INDIA)

## DIPLOMA IN COMPUTER HARDWARE MAINTENANCE & NETWORKING

**Eligibility :** 10<sup>th</sup>

**Duration :** 1 Year

**Course Code :** DP-02

**COMPUTER HARDWARE** :- Computer Organizations and Operating Systems(Windows and Linux) , Basic Electrical Engineering and Electronics , Microprocessors , Computer Hardware , Internet and Viruses , Principles of Data Communication & Network Maintenance , Digital Fundamentals , Computer Assembling and Software Installations , Hardware Lab , Project

**COMPUTER ORGANISATION & OPERATING SYSTEMS(WINDOWS AND LINUX)**

**TYPES OF COMPUTER** :- Analog, Digital, and Hybrid type, Hardware, Software, System software, Application software, Stored Program Concept and Von Newman Architecture, Firmware, Humanware, Stored Program Concept, Evolution of computers, Generation of computer.

**BACKGROUND AND NUMBER SYSTEM** :- Information Representation and Codes, Data Types, Complements, Addition and Subtraction of Binary Numbers, Fixed Point and Floating Point Representation, Octal and Hexadecimal System , Conversion of Number Systems, Alpha Numeric Codes – ASCII & EBCDIC, Error Detection Codes, Building Blocks of Computers, Combinational Blocks (Gates, Multiplexes, Decoders, Encoders etc.), Sequential Building Blocks (Flip Flops, Registers, Counters, Random Access Memory, etc.)

**REGISTER TRANSFER LANGUAGE AND MICRO-OPERATIONS** :- Register Transfer Language, Concept of Bus, Bus and Memory Transfer, Arithmetic Micro Operations, Logical and Shift Micro Operations

**ARCHITECTURE OF A SIMPLE PROCESSOR** :- A Simple Computer Organization, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Program Interrupts, Design of Basic Computer

**CPU ORGANIZATION** :- Addressing Modes, Instruction Formats, CPU Organization with Large Registers, Stacks and Handling of Interrupts and Subroutines, Instruction Pipelining: Storage, Hazards and methods to Remove Hazards

**PROGRAMMING LANGUAGES** :- Machine language, Assembly language, High level language

**ORGANISATION OF A DIGITAL COMPUTER** :- Input unit, Output unit, Central Processing unit, Memory

**DATA PROCESSING** :- Data collection, Classifications, Sorting and Merging, Processing, Summarizing , Storing

**DATA ORGANISATION** :- Organization Data, Character, Field, Record, File, Database, Sequential Access, Random Access, Indexed Sequential Access

**PROGRAMMING PROCESS** :- Problem Definition, Algorithm, Flowchart and coding, Testing and debugging, Implementation, Documentation, Structured Programming,

**DATA COMMUNICATION** :- Local Area Network, Wide Area Network, Satellite Communication, Internet

**OPERATING SYSTEM** :- Introduction, Different Operating Systems, Loading and Quitting the Operating Systems, Important DOS Commands



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## WINDOWS

**WINDOWS INTRODUCTION :-** Operating System

**DESK TOP ICONS :-** My Computer, Recycle Bin, Internet Explorer, Network Neighborhood, My Documents

**WORKING WITH WINDOWS :-** How to create a Folder, Copying and cutting files, Renaming

**START ICON :-** Programs, Favorites, Documents, Settings, Find, Run, Shut down

**APPLICATION ICONS**

**LINUX :-** History , Distributions , Devices and drives in Linux , File system hierarchy , Components: kernel, distribution, sawfish, gnome.

## BASIC ELECTRONICS

**Fundamentals :-** Alternative Current – Wave forms – Frequency – Period – Average value – RMS value – form factor – Simple AC circuits – Resistance – Inductance – Capacitance – Power and Power factor – Three Phase Systems – Star and Delta connection – Phase and Line values.

**Electronic Components**

**Passive Components :-** Resistors – Capacitors – Inductors – Transformers

**Active Components :-** Introduction – Semi Conductors – Diodes – PN Junction – Characteristics

**Transistors :-** PNP – NPN – Configurations – Characteristics – LED – Zener Diode – Photo diode  
SCR/FET – IC

**Communication :-** Introduction – Transmitters – Receivers – Modulation – Frequency bonds – TV

**MICRO PROCESSORS**

**Introduction :-** Role – Building Blocks – Buses – Speed and Performance – Instruction sets – CPU Chips – Fabrication – Packaging – Processor Sockets – Processor Power – Chip characteristics – Processor Cooling – CPU Upgrade

**Processor Generations :-** First – Second – Third – Forth – Fifth – Pentium – AMD K5 – Cyrix – Sixth Generation – Pentium Pro – PII – Celeron – PIII – P4 – AMD K6 (K6-2, K6-3) – AMD Athlon K7 – Athlon K75 – AMD Duron – Athlon XP – Cyrix MII – VIA Cyrix III – AMD Opteron – Pentium II Xeon – Pentium III Xeon – Athlon MP – Selection of CPU – Troubleshooting

**System Buses :-** Introduction – 8 bit ISA Bus – 16 bit ISA Bus – MCA Bus – EISA Bus – Local Bus – VESA Local Bus – PCI Bus – Expansion Buses – Troubleshooting

**Advance Chipsets :-** Introduction – Evaluation – Functions – I/O controller – Bridges – Pentium Chipsets – Non Intel Chipsets – Pentium II and Pentium Pro Chipsets – 810 SiS and Ali-820 – 820E – 815E – AMD 750 and 760 – 850E – 845G – 845GL – VIA Chipsets

Server Class Chipsets – Comparison

Chipset Selection

## COMPUTER HARDWARE

**Motherboards :-** Introduction – Functions – Types – Form Factors – Modern Motherboards – Sockets – Slots – Motherboards 440BX-810, 810E, 815, 815E-820-Athlon – P4 – Dual PIII – Maintenance



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**Supporting chips :-** Introduction – Types – Clocks Generator – Bus Conductor – PIC-DMAC-PIT-PPI-RTC

**Memory :-** Introduction – Organization – Primary – Secondary – DRAM – SRAM-Modules – SIMM – SIPP – DIMM – Asynchronous DRAM – Synchronous DRAM – Memory Requirement – Memory Upgrade – Errors – Parity Checking – Trouble shooting

**Logical Memory :-** Introduction – Real Mode Memory – Conventional Memory – UMA – Extended Memory – HMA – EMS – ROM – Shadowing – Optimization – Performance Improvement

**Display Adapters :-** Introduction – Display Subsystem – Evolution – Types – Components – Interfaces – Modes – MDA – CGA – EGA – VGA – PGA – XGA – SVGA – VESA – SVGA Standardization

**Graphic Accelerators :-** Introduction – Cards – Accelerated Graphic Ports – 3D Cards – Upgrading – Troubleshooting

## INTERNET APPLICATIONS

**INTRODUCTION TO INTERNET :-** Understanding Networks, Getting to know web browsers, Getting to know the Internet Explorer Window

**APPLICATIONS :-** Internet Electronic Mail, Setting up E-mail, Creating Mail Messages, Editing Mail Messages, Attaching a file to a Mail message, Sending and receiving mail messages, Creating and using an Address Book

**SEARCHING AND BROWSING ON THE INTERNET :-** Internet Searching, Tools for Specialized Searches, Finding Specific Topics

## PRINCIPLES OF DATA COMMUNICATION & NETWORK MAINTENANCE

**Modems :-** Introduction – Serial Communication – RS 232 – Flow Control – Cables – Analog Modems – Speed – Standards – Maintenance – Digital Technology – ISDN Services – Broad Band – Narrow Band – DSL – Wireless Connections – Port Problems – Modem Problems – Cable fault

**Network :-** Introduction – Uses – Concepts – Advantages – LAN – MAN – WAN – Components – Protocol – API – Setting up the Network – Installing Cables – Wireless Network – Installing and Configuring Network Cards – Hubs switches – Internet working – Intranet working – Repeaters – Routers – Networking security – Passwords – Firewall

**IEEE Standards :-** 802 – 802.3 – 802.4 – 802.5 – 802.6 Case study : NT/2000, NETWARE & LINUX

**NETWORK MAINTANANCE :-** Introduction to Computer Networks -Network Topology-LAN Technologies-Ethernet Standards-Network Troubleshooting Tools-Network Components-WAN Technologies-High-Speed Wan Media-Network Media (Cabling)-Media Access Methods-The OSI reference model-TCP/IP Suite-TCP/IP Utilities-Network Services-Remote Access & Security Protocols-Network Operating System (NOS)-Fault Tolerances-Internet-Network Support



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## DIGITAL FUNDAMENTALS

### LOGIC CIRCUITS

**Fundamentals of Binary System :-** Logic Gate Operations – Logic Variables – Boolean Algebraic Theorems – Binary number Systems – POS Min term & Max term specifications – Karnaugh (K) Map representations – Simplifications – uses

**FLIP FLOPS :-** Introduction – Different types of flip-flops – Characteristics - Truth table – propagation delay – Manufacturer specifications – Applications – Latches

### REGISTERS AND COUNTERS

**Flip-flop as a shift register :-** Serial-parallel data transfer – Typical circuits – Applications – Ripple counters – Methods to improve counter speed – design of counters – Types – Synchronous & Asynchronous, principles of operation, applications, IC versions.

**LOGIC FUNCTIONS :-** Address – Different types – Comparators – Decoders – Code converters – Multiplexer – De-multiplexer - Parity generator – Familiarization of popular IC versions – Typical circuits & applications.

**SYSTEM INTERFACING :-** Introduction – A/D Converters – D/A Converters – Types of converters – Applications

## COMPUTER ASSEMBLING AND SOFTWARE INSTALLATIONS

**PC Upgrading :-** Introduction – Upgrade Essentials – Performance Upgrade – Capacity Upgrades – Features Upgrades – Repair Upgrades

**Preventive Maintenance :-** Introduction – Need – Tools – Materials – Procedures – Active Hardware Maintenance – Active Software Maintenance – Passive Maintenance Procedures – Heat and Temperature Control – Dust and Pollution control – Ventilation Control – EMI – Electrostatic Discharge Control – Humidity and Corrosion Control – Shock and Vibration Control – Preventive Maintenance Schedule

**Troubleshooting :-** Introduction – Types of PC Faults – Solid Faults – Intermittent Faults – Developing Strategy – Diagnostic and Repair Tools – Diagnostic Software Tools – Diagnostic Hardware Tools – Advanced Testing Tools – Hand Tools for Service Engineers – Disassembling PC

**Computer Assembling :-** Introduction – Overview of Parts of PC – Cabinet – Motherboards – Video Cards – Sound Cards – Modems – Hard Drive – Zip Drive – CD ROM Drive – Network Card – Interfaces – CPU – Main Memory – Power Supply

**Setting up the Motherboard :-** Installing CPU – Setting the Clock Speed – Installing the Memory

**Installing Video Card :-** Testing – Plug in the Video Card – Providing Power to the Motherboard – Testing

**Installing Floppy Drives :-** Installing Hard Disk Drives – Installing the CD ROM Drive – Installing Key Board and Mouse

Installing Sound Card

Installing Modem

**Installing the Motherboard :-** Installing the Power Supply – Attaching Add-on cards – Installing the Drives – Testing – Parallel and Serial Port Connection – Front Panel Indicators and Speakers – Troubleshooting

### Operating System Installation

**BIOS :-** Introduction – Features – Developers – Identification – Interrupts – Disk Services – Serial Port Services – Video Services – Printer Screen Services – Flash Memory – BIOS Upgrade – Troubleshooting



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**CMOS setup :-** Introduction – Standard CMOS Setup – Advanced CMOS Setup – Advanced Chipset Setup – Power Management Setup – PNP/PCI Setup – Peripheral Setup – Auto Detect IDE Device – CPU Frequency / Voltage Control – CPU PNP Setup – Password Settings – Auto Configuration – Exit Options – BIOS Optimization – Maintenance – Troubleshooting

**Power On Self Test (POST)**

**Partitioning and Formatting :-** Introduction – Low Level Formatting – IDE Drives – SCSI Drives – Partitioning - Options – Efficient Partitions – Clusters – FAT 16 – FAT 32 – NTFS – FDISK – Steps for Partitioning – Logical Drives – Primary Partition – Extended Partition – Partitioning Large Drives – Backing up Partition Information – Bad Sectors – Scan Disk – Third Party Partitioning and Formatting Tools – Troubleshooting



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