

# Course Name: Diploma in Hardware & Networking

Duration of Course: 1 Year

Eligibility: 10+2 or equivalent

## Semester 1<sup>st</sup>

## Semester 2<sup>nd</sup>

CODE	SUBJECTS	CRED-ITS	CODE	Subjects	Credits
DHN101	Fundamentals of Information Technology & Operating Systems	4	DHN201	Computer Networks	4
DHN102	Basics of Electronics & Microprocessor	4	DHN202	Windows 2003 Server Administration	4
DHN103	PC Assembling & Troubleshooting	4	DHN203	Linux Administration	4
DHN104	Programming in C	4	DHN204	Database Administration	4
DHN105	Communication & Soft Skills	4	DHN205	Software Lab- 1 (Windows 2003 Server & Linux)	4

## **Detailed Syllabus**

**Semester: 1<sup>st</sup>**

**Subject: Fundamentals of Information Technology & Operating Systems**

**Code: DHN101**

### ***Section A***

#### **Introduction**

What is computer? Characteristics of Computers. How Computers evolved. Some earlier computers like Mark-I, EDVAC, EDVAC, EDSAC, UNIVAC. The five computer generations-key technologies, features and characteristics of each generation.

#### **Basic Computer Organisation**

Five basic operations of a computer. Block diagram showing basic organization of a computer system. Input Unit, Output Unit. Storage Unit: Primary storage, Secondary Storage. Arithmetic Logic Unit. Control Unit. Central Processing Unit. The System Concept. The Main Memory. Main Memory Organisation. Main Memory Capacity. RAM, ROM, PROM, EPROM, UVEEPROM, EEPROM. Cache Memory.

#### **Number Systems**

Non-Positional Number Systems, Positional Number Systems: Binary, Octal, Hexadecimal number system, Converting from one number system to another.

#### **Computer Arithmetic**

Why binary numbers instead of decimal numbers. 7-bit ASCII Code. Binary arithmetic:

Addition, Subtraction.

### ***Section B***

#### **Secondary Storage Devices**

Secondary Storage Devices: Limitations of primary storage, Sequential and Direct- Access Devices. Magnetic Disk, Basic principle of operation, Storage Organisation, Storage Capacity, Access mechanism, Access Time: Seek Time, Latency, Transfer Rate. Disk Formatting, Disk Drive, Disk Controller, Types of Magnetic Disks, Floppy Disks, Floppy-disk Drive, 3½-inch Floppy Disk, Hard Disks: Zip Disks, Disk Packs, Winchester Disk, Advantages and Limitations of Magnetic Disks, Uses of Magnetic Disks. Optical Disk, Basic principle of operation, Storage organization, Storage capacity, Access Mechanism, Access Time, Optical Disk Drive, Types of Optical Disks: CD-ROM, WORM Disk, Advantages and Limitations of Optical Disks, Uses of Optical Disks

#### **Input Devices**

Keyboard. Point and Draw Devices: Mouse, Trackball, Joystick, Electronic pen, Touch Screen. Data Scanning Devices: Image Scanner: Flat-Bed and Hand-held Scanner, Optical Character Recognition Device, Optical mark reader, Bar-Code Reader, Magnetic-Ink Character Recognition. Digitizer. Electronic-card Reader. Voice Recognition Devices. Vision-Input System

#### **Output Devices**

Monitors Printers: Dot-Matrix Printers, Inkjet Printers, Laser Printers. Screen Image Projector. Voice Response Systems: Voice Reproduction System, Speech Synthesizer

## **Computer Software**

What is Software? Relationship between Hardware and Software, Types of Software: System Software, Application Software, Functions of System Software, Type of System Software: Operating Systems, Language Translators, Utility Programs, Communications Software. Application Software, Commonly Used Application Softwares: Word Processing, Spreadsheet, Database, Graphics Personal Assistance, Education, Entertainment Software. Logical System Architecture showing relationship between hardware, system software, application software and users of a computer system. Firmware

## **Computer Languages**

Analogy with natural languages, Machine Language, Advantages and Limitations of Machine Language, Assembly language: Assembler. Advantages of Assembly Language over Machine Language. Limitation of Assembly Language, High-Level Language: Compiler. Linker, Interpreter. Advantages and Limitations of High Level Languages, Some High Level Languages: Basic, Pascal, C, C++, Java.

## ***Section C***

### **Operating Systems**

What is an Operating System? Main Functions of an Operating System. Measuring System Performance: Throughput, Turnaround time, Response time. Process Management: Process management in early systems. Multiprogramming: Requirements. Multitasking. Multiprocessing: Advantages and limitations. Difference between Multiprogramming and Multiprocessing. Timesharing: Requirements, Advantages.

## ***Section D***

**Memory management:** Uniprogramming, Multiprogramming with fixed and variable number of memory partitions. Virtual memory: How is virtual memory realized? , Advantages and disadvantages of virtual memory. File management: File access methods-Sequential and Random access files, File operations, File naming. Command Interpretation: Command line interface, Graphical user interface. Some popular operating systems: Unix, MS-DOS, Microsoft Windows, Linux

### **The Internet**

What is Internet? Brief History. Electronic mail. File Transfer Protocol. World Wide Web. WWW Browsers. Uses of the Internet

## **Detailed Syllabus**

**Semester: 1<sup>st</sup>**

**Subject: Basics of Electronics & Microprocessor**

**Code: DHN102**

### ***Section A***

#### **Analog Electronics**

##### **Basic Concepts of Electricity**

Work and Energy, Matter and Electrons, Conductors, Insulators, Semiconductors, Electrical potential difference.

##### **Electrical Terms**

Voltage, Current, Resistance, Power, Efficiency, Ohm's law

##### **The Electric Circuit and Voltage Generation**

The need for a complete path, Basic circuit elements: Source, Control element, Switches, Relays, Load. Voltage rises and Voltage drops. The concept of ground. Circuit Problems : shorts, opens.

### ***Section B***

#### **Resistors**

Fixed resistors: Carbon composition resistors, Wire wound resistors, Resistor color code, Film type resistors. Variable resistors

#### **Series Circuits**

Two resistor circuits: Finding current values, Finding voltage drop values.

#### **Parallel Circuits**

Two resistor circuit: Finding current value in each branch.

#### **Inductors and Capacitors**

Inductors, Inductance, Capacitors, Capacitance, Capacitor ratings.

#### **Alternating Current Terms**

Amplitude, Period, Frequency, Wavelength, AC Waveforms.

#### **Transformers**

Principle, Turns ratio, Types of Transformers: Low frequency, Intermediate and Radio frequency transformers. Voltage step up and step down.

#### **Semiconductors Materials and Rectifiers**

Properties of Semiconductors, Commonly used semiconductors, Intrinsic Semiconductor, Extrinsic Semiconductor, PN Junction, and Diode, Rectifiers (Half Wave, Full Wave, and Bridge).

#### **Tubes, Transistors and Integrated Circuits**

Vacuum tubes, Vacuum tube diode, Amplification. Transistor: NPN and PNP schematic symbols. Transistor switches. Introduction to Integrated circuits.

## ***Section C***

### **Digital Electronics**

#### **Boolean Algebra and Digital Circuits**

Fundamental concepts of Boolean Algebra, Logic gates, Converting Boolean expression to Logic circuits.

#### **Multiplexer and Demultiplexer**

Digital Multiplexers/Data Selectors (4 to 1), Digital Demultiplexers (1 to 4).

#### **Flip Flop Devices**

Bistable device, What is a Flip-Flop, Working of RS Flip Flop, D Flip-Flop, J-K Flip-Flop.

#### **Registers and Counters**

Principle of Shift Registers, Working principle of Counters.

## ***Section D***

### **Introduction to Microprocessors**

Concept of bus: address bus, data bus, control bus, Block diagram showing the architecture of 8085 Microprocessor, Brief introduction of different units, Basic instructions ( MOV, LDA, STA, ADD, SUB, INR), Introduction to assembly language using these basic instructions: Loading data, Moving data, Addition of two numbers.

## **Detailed Syllabus**

**Semester: 1<sup>st</sup>**

**Subject: PC Assembling & Troubleshooting**

**Code: DHN103**

### ***Section A***

#### **Components of a PC**

Identifying the major components of a PC: System unit, Monitor, Keyboard, Mouse devices, Handling PC connections.  
Identifying the internal components of a PC: Opening a system unit, Handling expansion cards.

#### **CPU**

Identifying the right CPU for any motherboard : CPU manufacturers, Processor models, CPU speeds, Processor packages  
Installing and Upgrading CPUs. Heat Sink and Fan assembly.

#### **RAM**

What does RAM do, Types of RAM Technologies: SDRAM, DDRSDRAM, RDRAM, RAM Packages: SIMMS, DIMMS and RIMMS. Adding and Upgrading RAM.

#### **Motherboard and BIOS**

Common motherboard features, Types of Motherboards: AT, ATX, microATX, Proprietary Motherboards. Installing a motherboard. The System BIOS: Why do we need BIOS

### ***Section B***

#### **Expansion Bus**

Expansion Buses, Internal Buses: ISA, PCI, AGP, Installing a Plug and play Expansion

Card, External Expansion Buses: USB.

#### **Power Supplies and Cases**

Case Form Factors: AT, ATX, miroATX, Power Supply: Wattage, Connectors. Cooling: Power supply Fan, Caser Fans.

#### **Removable Media**

Identifying, Installing and Troubleshooting Floppy Drives: How floppy drives work, Floppy Drive Cables, Installing a Floppy Drive, Bootable Floppy Disks.

#### **Hard Drives**

How hard drives store data: Partitions and File Systems. Installing a Hard Drive, Configuring a Hard Drive: Partitioning, Formatting. Hard Drive Maintenance and Troubleshooting: ScanDisk, Defragmentation, Disk Cleanup.

### ***Section C***

#### **CD Media**

Understanding CD Media Technologies: CD data storage, CD-ROM, Speeds, CD-R, CD-RW, DVD, Installing CD Media Drives, Using CD Media: Autoplay in Windows XP, Burning CDs. CD Media Troubleshooting: Drive problems, Disc problems..

#### **VideO**

Selecting the right Monitor. CRTs: How CRTs work. LCDs: How LCDs work. Selecting the right video card: Graphics processor, Video RAM. Installing and configuring video software. Troubleshooting Monitor Problems: Fuzziness, Missing color, missing pixels, Dim screen, No image. Video Card Problems.

## ***Section D***

### **Input Devices**

Installing a Keyboard, Connections: DIN, USB, Wireless. Mouse: Standard, Optical, Mouse connections.

### **Sound**

How sound works in a PC, MIDI, Purchasing the right sound card: Processor capabilities, Speaker support, Recording quality. Installing a sound card in a Windows System, roubleshooting Sound.

### **Printers**

Identifying Current printer Technologies: Dot matrix, Inkjet, Laser. Installing a Printer on Windows PC, Performing basic Printer maintenance, Recognizing and fixing basic printing problems

## **Detailed Syllabus**

**Semester: 1<sup>st</sup>**

**Subject: Programming in C**

**Code: DHN104**

### **SECTION A**

Constants, variables, Keywords, Decision Control Structure (if, Ifelse, Nested ifelse, switch), Loop control Structures (While, Dowhile, for), Continue, break. Storage classes (Automatic, Register, Static, External). Macro, Macros with arguments, macros versus functions.

### **SECTION B**

Function Definition, Accessing function, function prototype, passing arguments to function (call by value, call by reference).

### **SECTION C**

Processing as array, passing array to functions, multidimensional arrays, string functions (Strlen (), strepy(), streat(), strcmp() etc.)

### **SECTION D**

Pointer declaration, Passing Pointer to functions, Dynamic memory allocation, operations on pointers, Array of pointers Defining and processing of structures and unions, structures versus unions.



## **Detailed Syllabus**

**Semester: 1<sup>st</sup>**

**Subject: Communication & Soft Skills**

**Code: DHN105**

### **SECTION A**

Basic Skills :Listening,

Speaking, Reading & Writing.

A Practical study of Grammatical Rules (Noun, Pronoun, Adjectives, Verb, Adverb)

Tenses :Types

of Tenses

### **SECTION B**

Idioms & Phrases,

Confused words :Paronyms,

Homonyms

Synonyms, General Abbreviations,

One word Substitution

### **SECTION C**

Simple present, progressive & present perfect, Simple past, progressive & Past

perfect, Indication of Futurity, the passive ( Present & Past, Present & Past Perfect).

Reported Speech :(

I) Declarative Sentences (II) Imperative

(III) Interrogative (Question) (IV) Active, Passive

(V) Preposition (VI) Articles

### **SECTION D**

Writing Skills :Paragraph

Writing, Composition Writing, Report Writing, Application & Letter Writing,

Essay Writing.

## **Detailed Syllabus**

**Semester: 2<sup>nd</sup>**

**Subject: Computer Networks**

**Code: DHN201**

### **SECTION A**

Uses of Computer Network, Network Hardware, Network Software, Goals and Applications of Computer networks, Computer Network Structure and Architecture. Reference Models: OSI Reference Model, TCP/IP reference Model, Comparison of OSI and TCP Reference Model, Introduction to Novell Netware, ARPANET.

### **SECTION B**

Local Area Network: IEEE standards 802 for LAN's and MAN's (802.2, 802.3, 802.4, 802.5, 802.6). Bridges from 802.x to 802.y, transparent bridges, source routing bridges, remote bridges, comparison of 802 bridges, High speed LANs – FDDI, Fast Ethernet, HIPPI, Fibre channel, Satellite network Polling, ALOHA, FDM, TDM, CDM.

### **SECTION C**

The Internet Protocol Introduction to Internetworking, The IP protocol, IP Addresses, Subnets, Internet Control Protocol, Interior and Exterior gateway routing protocol., internet multicasting mobile IP, CIDR, IPv6.

### **SECTION D**

The Transport Protocol – Elements of transport protocol, A simple transport protocol, TCPService model, TCP protocol, Segment header, Connection management, Transmission policy, Congestion control, timer management, UDP.

## **Detailed Syllabus**

**Semester: 2<sup>nd</sup>**

**Subject: Windows 2003 Server Administration**

**Code: DHN202**

### ***Section A***

#### **Overview of MS Windows Server 2003 System Administration**

Microsoft windows server 2003, Domain controllers and members servers, Understanding and using server roles, frequently used tools, Using control panel utilities, Using graphical administrative tools, Using command line utilities.

#### **Managing Servers Running Windows Server 2003**

Managing networked systems, connecting to other computers, sending console messages, using computer management system and storage tools, Working with services and applications, Managing System environments, profiles and properties, Managing hardware devices and drivers.

### ***Section B***

#### **Monitoring Processes, Services and Events**

Managing applications, processes and performance, Task manager, Administering applications and processes, Viewing and managing system performance and networking performance, Managing system services, Event logging and viewing, Monitoring server performance and activity, Why monitor your Server?, Getting ready to monitor, Using performance logs ,Viewing and replaying performance logs, Configuration alert for performance counters, Running scripts as actions, Tuning system performance, Monitor and tuning memory usage, processor usage, disk I/O.

### ***Section C***

#### **Understanding User and Group accounts**

The windows server 2003 security model, Differences between user and group accounts, Default user accounts and groups, Account capabilities, Using default group accounts.

#### **Creating User and Group accounts**

User account setup and organization, Configuring account policies, Configuring user rights policies, Adding a user account, Adding a group account, handling global group membership.

### ***Section D***

#### **Working with Support Services and Remote Desktop**

Introducing support services, Working with the automated help system, using the help and support center, introducing the application frame work, monitoring system health. Understanding and using automatic updates, an overview of automatic updates, configuring automatic updates, and update servers, downloading and installing automatic updates ,removing automatic updates to recover from problems, Managing remote access to servers, Configuring remote assistance and remote desktop access, Making remote desktop connections, Configuring windows time and window server 2003, enabling and disabling window time on stand – alone and member servers.

## **Detailed Syllabus**

**Semester: 2<sup>nd</sup>**

**Subject: Linux Administration**

**Code: DHN203**

### ***Section A***

#### **Installing Red Hat Linux**

Starting the Red Hat Linux installer, Beginning the installation, Installation type, Disk partitioning setup, Disk setup, Boot loader configuration, Account configuration, Installing packages, Graphical interface configuration, Finishing first run configuration.

#### **Navigating Linux at the Console**

Understanding virtual consoles, Logging in a virtual console, Introducing the shell, Working with the filesystem, Linux file system, Home directory, Current working directory, manipulating files and directories, Understanding permissions.

### ***Section B***

#### **Making the console work for you**

Creating, Editing and Saving text files using vi, Using emacs to create text files, Grouping files for efficient file management, Searching files and directories quickly, Using pipes, Moving between multiple open applications.

#### **Introducing the Red Hat Desktop**

GNOME and KDE Environment, Logging in to desktop, Launching applications, Using window controls, working with multiple windows, Understanding virtual desktops.

### ***Section C***

#### **Working with files on the desktop**

Opening, editing and closing an existing file, Cutting, copying and pasting files, Duplicating a file, Renaming, Deleting items, Changing file permissions, Creating a new directory, Manipulating files using drag and drop, Working with trash contents.

### ***Section D***

#### **Command Line System Administration**

Using the `command`, Managing system processes, Managing running services, Managing file systems, Managing accounts.

#### **Desktop System Administration**

Managing system processes, Managing running services, Managing network interfaces, Managing accounts, Reading system logs, Mounting and unmounting file systems

## **Detailed Syllabus**

**Semester: 2<sup>nd</sup>**

**Subject: Database Administration**

**Code: DHN204**

### ***Section A***

**Intro to Database and SQL Server 2000:** Client/Server Concept, Types of Databases, Relational Vs. Flat File Database. Background of SQL Server, Versions of SQL Server and Clients Supported by SQL Server. Installation & Configuring SQL Server: Installing SQL Server 2000, Unattended Installations, SQL Server Services. Configuring SQL Server Network Protocol Settings. Installing SQL Server Clients.

**SQL Server Tools and Utilities:** Managing SQL Server with Enterprise Manager, Query Analyzer, SQL Server Groups. Tools Menu, Action Menu. Introduction to Transact – SQL(T-SQL)

### ***Section B***

**Managing Database:** Creating Database, Database File Placement(RAID 0, RAID 1 RAID 5), Creating Database using T-SQL and Enterprise Manager. Altering, Renaming, Dropping Database. Creating Objects in Database: Tables, Views, Constraints, Indexes.

**Managing Security:** Understanding Security Modes, Windows Authentication Modes, Mixed Mode, SQL Server Logins, Windows Logins, Fixed Server Logins, Creating Users, Database Roles, (Grant, Revoke, Deny) N-Tier Security.

### ***Section C***

**Database Backups and Restore:** Copying Database with Copy Database Wizard. SQL Database Backup Modes(Full, Differential, Transactional Log Backup). Backing Up of the Database. Restoring Database. DTS: Its meaning, DTS Packages. DTS Storage and Designer.

### ***Section D***

**SQL Server Agent:** Configuring Understanding Alerts, Jobs and Events. Creating Jobs: Multi Server Jobs, Creating, Editing and Deleting of Jobs. Optimization Techniques: Queries and Stored Procedure, Proper Indexing, Locks and Defragmentation.