



Uttar Pradesh Rajarshi Tandon Open University

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Syllabus

for

Diploma in Hardware Technology (DIHT)

(THE NEW COURSE STRUCTURE AND SYLLABUS WILL BE EFFECTIVE FROM THE ACADEMIC SESSION JULY 2015-16. THEREFORE THOSE STUDENTS WHO WILL BE ENROLLED/ADMITTED IN FIRST YEAR FROM SESSION JULY 2015-16 & ONWARDS WILL STUDY ACCORDING TO THIS NEW SYLLABUS AND THE STUDENTS ADMITTED BEFORE JULY 2015-16 WILL FOLLOW OLD SYLLABUS.)

November 2016

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Diploma in Hardware Technology (DIHT)

1.1 Course Details and Structure

Diploma in Hardware Technology (DIHT)

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| कार्यक्रम कोड / Programme Code | : 506 | कार्यक्रम अवधि (वर्षों में) | : न्यूनतम : 1 अधिकतम 2 |
| कार्यक्रम माध्यम / Medium of Instruction | : अंग्रेजी / English | Programme Duration (In Yrs.) | : Minimum : 1 Maximum 2 |
| प्रवेश हेतु न्यूनतम अर्हता / Minimum Qualification for Admission | : 10+2 | कार्यक्रम शुल्क / Programme Fee | : 8000/- |
| | | अभिन्यास कार्य / Assignment Work | : आवश्यक नहीं / Not Essential |

Course Code and Details

| Semester | Paper No. | Course Code | Title of the Course | Credits |
|-------------------------|-----------|-------------|---|---------|
| 1st Semester | 776 | DIHT-01 | Fundamental of Computer and IT | 8 |
| | 777 | DIHT-02 | Basic Electronics Devices and PC Software | 8 |
| Credits of 1st Semester | | | | 16 |
| 2nd Semester | 778 | DIHT-03 | Computer Interfacing Devices | 8 |
| | 779 | DIHT-04 | Computer Network and Security Maintenance | 8 |
| | 780 | DIHT-05 | Project Work | 8 |
| Credits of 2nd Semester | | | | 24 |
| Total Credits | | | | 40 |

1.2 DIHT-01 (Fundamentals of Computer and IT)

Introduction to Computer:

Computer Basics: Characteristics of Computer, Application of Computer.

Basic Components of Computer: Components of Computer, CPU, Memory, Keyboard, Mouse, VDU, Printers, RAM, ROM, CD-ROM, Hardware and Software.

Classification of Computer: Analog, Digital Hybrid Computer, General purpose, Special

Computer, Micro, Mini, Mainframe Computer, Super Computers, Desktop, Laptop, Palmtop.

Representation of Data/information: Information Technology, Data, information, Data processing, Characteristics of information, Scope of information, Basic data types.

Basics of Digital Electronics:

Digital Number System : Number System, Decimal System, Binary System, Octal System, Hexadecimal System, Code Conversion, Binary Codes, 8421 Code/BCD Code, 2421 Code, 5211 Code, Reflective Code, Sequential Codes, Non weighted codes, Gray Code, Error Detecting and Correction Codes, ASCII Code, EBCDIC Code, Floating point Numbers.

Digital Logic Gates: Gate. AND, OR, NOT, BUF, NAND, NOR, XOR, XNOR, Universal Gates.

Simplification of Boolean Functions: Karnaugh Maps, Minimization Technique upto 5- variable K-map, Inverse function.

Digital Combinational Circuit: Decoders, Encoders, Priority Encoder, Multiplexer, De-Multiplexer, Boolean Function, Implementation, Mux-Demux Application Example.

Sequential Circuits: Concept of Sequential logic, Asynchronous sequential circuit, Synchronous sequential circuits, Latches and Flip-Flops, RS, JK Latch, JK Master Slave Flip-Flop, Sequential circuits Design.

Memory System:

Introduction of Memories System: Memory Cell, Block diagram of Memory Cell, Memory locations and address, Memory operations, Memory hierarchy.

Main Memories: Semi-conductor RAM Memories, Static Memories, Dynamic RAM, Performance Measure, SDRAM, ROM, Flash Memory, Speed, size and cost of memory.

Secondary Storage Memories: Magnetic Disk Memory, Floppy Disk Memory, RAID Disk Arrays Optical Disk.

High Speed and Virtual Memories: Cache Memories, Performance Consideration, Virtual Memories, Demand Paging.

Microprocessor:

Introduction to Microprocessor: Evolution, Introduction and Characteristics of Microprocessor Systems, Microprocessors Register Structure, ALU, Timing and Control Unit, CPU, Memory, Input/Output, Hardware, Software and firmware, Machine Language, Assembly language, High level language.

8085 Microprocessor : Architecture, Software Model, Functions and operations, Instruction and Data format, Opcode format, Data transfer Instructions, Arithmetic instructions, Addressing Mode of 8085.

16-Bit Microprocessor: Architecture, Bus interface unit, Execution Unit, Register Organisation, Memory Segmentation, Software Model of 8086, 8088 Microprocessor.

Advanced Microprocessors and Micro Controllers: Introduction to 32 bit and 64 bit Microprocessors, The 80386. Microprocessor, The 80486 Microprocessor, Pentium Processor, Motorola 68XXX Processors, Microcontrollers.

1.3 DIHT-02 (Basic Electronics Devices and PC Software)

System Software:

Software: Software, Classification of Software, Types of Software, Software Packages, Evaluating Packages, Selection Process, Market of Packaged software.

Operating System Techniques : Multiprogramming, Multiprocessing, Multitasking, Batch Processing Operating Systems, User interface.

Linker and Loader: Linker, Loader, Address binding, Compiler Drivers, Basic loading, with relocation, Position – Independent Code, Bootstrap loading, Dynamic Linking, Dynamic loading.

Programming languages and its types: Classification of Programming Language, procedural language, functional language, Logic oriented languages, object-oriented languages, Parallel Processing Languages, Program Structure, Conditional Structures, Looping Structures.

Operating System :

Concept of Operating System: Services of O.S., Functions of O.S., Characteristics of an operating system, Advantages of an O.S., Types of O.S., Operating System Techniques.

Disk Operating System : DOS 1-2, Directory, Main operations on Files, DOS Commands.

Windows: Windows 95, The windows 95, Desktop, Menus, working with Program and Document windows, Dialog Boxes, Control Panel, About help, Difference between Windows 95 and Windows 98.

System files: Booting sequence, Batch File, Executable file, Config. File, Com file

Windows XP :

Features of windows XP : About Windows XP, System requirements for windows XP, Features new to windows XP.

Files and Folders: Files and Folders, Control Panel, Windows Registry, DLL.

Windows Installation: Installation of Windows XP, Process, Description of Universal plug and play features in windows XP.

Setting in Windows XP : Device Manager, Set up your Screen Saver, User Account Passwords.

LINUX Operating System :

Features of LINUX: History, Features, Structure of Linux, Differences between Linux and UNIX, Difference between Linux and MS Windows, Hardware requirements, space requirements and Coexistence.

Directories and File Systems: File System, Permissions, Terminals, Common Commands, The mount and umount Command, File Compression, backing up and restoring.

Linux Installation: Installation Overview, Installation in Detail, Repartitioning your DOS/Windows drives, Partition basics, choosing console or X installation, Post- Partition Steps, Installing software Packages.

Booting Process in Linux : First time log-in, shutting down/rebooting, Booting in Linux, system startup, Init, Configuring Boot Loaders, virtual consoles.

1.4 DIHT-03 (Computer Interfacing Devices)

Introduction to Motherhood:

Basics of Motherboard: Installation of CPU, PC Board or Motherboard, CPU Speed, Microcode Efficiency and Pipelines, Word Size, Data path, Internal Cache memory, Slots and sockets.

Concept of various CPU and PC Buses: CPU Chips, concept of Bus, AT Bus (ISA), PS/2 Bus, EISA, Local Bus, Latest Bus PCI, AGP, PC Card (Portable Bus), PC Card Features, Mini PCI, Card Bus.

Introduction of various controllers: System controllers, Video Adapter, Floppy Disk Controller and Disk Drivers, IDE Controller, SCSI Host Adapter, Serial Port, USB, Firewire or IEEE 1394.

Understanding the Speed and Role of Connectors: System clock/ Calender and CMOS chip, Location and Identification Components.

PC Assembly:

Requirements before PC Assembly: PC Repair tools, Avoidable tools, General PC Disassembly Advice.

Upgradation of Motherboard: Diagram, Remove the board Correctly, Remove the Drivers, Remove the Power supply, Remove the CPU and RAM, upgradation of Computer.

Installation and Configuration of New Motherboard: Installation of New Circuit board, Application of plug and play, Configuration of New Circuit Boards, software, Switch setup Advice, Avoiding Configuration Conflicts, Understanding I/O Addresses, DMA, RAM, and ROM Addresses.

Maintenance of Motherboard: Resolving Drive conflicts, PNP, DIP switches, Finding the Bad Boards, Failure of Boards.

PC Memory:

Understanding the PC Memory: Installing RAM, Memory sizes, speeds and shapes, Memory Modules, Motherboard Chipsets, Dynamic RAM, SDRAM, FPM and EDO DRAM, DDRS-DRAM, SLDRAM.

Managing the PC Memory: Memory Maintenance in the DOS world, Device Drivers, Command Shell, Video RAM, Flash RAM, Buffers and Frames, Extended Memory, EMS, LIM, PAGED, Expanded Memory.

Testing and Trouble-Shootings of Memory: Power Drops and Surges, Mismatched chip speeds and Manufactured, Memory tests.

Assembling and maintenance of Power supply: Components of the Power Supply, Form Factor connectors, Power Problems, Devices to Remedy Electrical Problems .

Working with Hard Disk Drive:

Basics of Hard Disk Drive: Magnetic Recording, Data Recording Method, Data Encoding Method, NRZ, Hard Disk Drive.

Interfacing Devices of Hard Disk Drive: ST-506/412, ESDI, ATA IDE, ATA Cable/Connector, SCST, Logical working of Hard disk Drive.

Installation and Configuration of HDD: Software setup, setup configuration, Low level formatting , HD test, Non-destructive Formatters, surface Analysis, Defect free Drivers, Drive Partitioning, FDISK.

Maintenance and trouble-shooting of HDD: Un-erasing a file, undeleting partially overwritten file, unformatting Hard disks, Backing up and Restoring MBR, with DEBUG, Hardware Failure, Check stepper Motor, Check the Controller, Disk Media Error, check drive cables, Check Drive is spinning.

1.5 DIHT-04 (Computer Network and Security Maintenance)

Network Basics:

Introduction: Networking, Need, Advantages and Types.

Network Topologies: Terminology, Bus Topology, Ring Topology, Star topology, Hybrid Network Topology.

Network Protocols, Hardware and Software: Networking Protocols, Standards, Network Hardware, Internetwork and Network software.

Network Design and Configuration: Network components/Configurations, Directions, Procedure.

Transmission and Network Elements:

Signal Transmission: Terminology, Data transmission, Connection- oriented and Connection-less Transmissions, Synchronous and Asynchronous Transmission, Transmission Media, Analog Signals.

OSI Reference Model: Terminology, the OSI Model.

Ethernet: Terminology, Ethernet origins, Ethernet configuration, Ethernet communication, Ethernet collision, Ethernet frames, Frames types.

Network and Devices: Token Ring Architecture, Fiber Distributed Data Interface (FDDI), Token Ring Case Study, ATM, Connectivity Devices, Transceivers, Repeaters, Hubs, Media Dependent Adapter, Internetworking Devices, Gateways.

Internet Connectivity:

The Internet: Usage, Architecture of the Internet, IP, TCP/IP Reference Model, Unified Networks.

The Internet Services: E-Mail, Remote login, ISPs, Message transfer, File Transfer Protocol (FTP), Telnet, Leased line.

ISDN and Bridge-Routers: ISDN, NFAS, Advantages of ISDN, Interfaces, Physical layer Protocols, 2BIQ, Link layer Protocols, Bridge- Routers.

ISP Connectivity: Internet service Provider (ISP), ISP Connection Options, DSL, Cable Modem, DSL, SHDSL, Broadband Access, Dynamic DNS.

Installation and Administration: :

Network Operating Systems: Terminology, Network Operating Systems, Windows for Workgroups/Windows 95/Windows NT Server, UNIX/LINUX, MAC OS Apple Share.

World wide web and client server Model : www, architecture of www.

Network Planning and Management: Quality of Service Analysis, Propagation Delay, Response Time, Throughput, Workload, Network, Maintenance and Management, Network Management tools.

Network Security: Cryptography, Encryption, Authentication , Firewalls, Proxy Servers, Virtual Private Networks (VPNs).