

Diploma in Computer Hardware Maintenance and Network Technologies(DCHMNT)

Duration: One year including 3 months industrial Training

The examination and evaluation pattern : Same as BTE

The Structure of the DCHMNT program (Total 32 CP)

- Digital Computer Electronics, Theory (4CP)
- Digital Computer Electronics, Practical (4CP)
- How computer works? , Theory (4CP)
- How computer works? , Practical (4CP)
- How computer is maintained? Theory (4CP)
- How computer is maintained? Practical (4CP)
- Networking Technologies, Theory (4CP)
- Networking Technologies, Practical(4CP)

Detail Syllabus of the DCHMNT program:

Course 1)Digital Computer Electronics, Theory (4CP)

1. Number Systems - Decimal and Binary
 - Why binary system is preferred?
 - Decimal to Binary and vice versa conversion
 - Hexadecimal Numbers- Hexa to Binary and Binary to Decimal vice versa conversion
 - BCD numbers and ASCII code
2. Gates-
 - OR-AND gates- Basic Boolean Algebra- Invertors
 - NOR-NAND gates - D'morgan Theorem (1 and 2)
 - Exclusive OR gates, Exclusive NOR gates
 - Controlled Invertors
3. TTL-
 - Digital Integrated Circuits (ICs)
 - TTL characteristics, AND / OR gates using TTL, Open collector Application and Advantages
 - MOS, CMOS
 - Multiplexer
 - IC devices like 74.... Family

4. Boolean Algebra and Karnaugh Maps-
 - Boolean Relations, Sum of products method, Algebraic specification
 - Karnaugh Map, Pairs, Quads, Octets, No care condition (4 variables)
5. Logic Units-
 - Binary addition and subtraction - Half and full adders (Binary adders)
 - 2's and it's compliment- Adders and Subtractors, Signed Binary numbers
 - MOS, CMOS encoder
6. Flip- Flops-
 - Simple flip-flop action – RS latch - De latching level checks
 - Edge triggering advantages - D and JK flip-flops edge triggering
 - JK master and slave flip-flops
7. Registers, Counters -
 - Register meaning - Buffer - Shift and controlled shift registers three state registers - devices
 - Counters - It's necessity, Simple circuits, Ripple, Synchronous, Ring counters, Devices.
 - Bus organized computers.
8. Memories :
 - ROM, PROM & EPROM - RAM - Constructing a small memory and its Hexadecimal Address.
 - Flash, DRAM memories

Course 2) Digital Computer Electronics, Practical Course (4CP)

1. Identification and Testing of computer electronic components
2. Soldering and De-soldering practice, Assembling and testing of Bridge rectifier
3. Activity on No systems - Hexa Decimal
4. Study of Homkit manual and study of logic gates with switches.
5. Study of logic gate operations (AND , OR) circuit diagram
6. Study of basic gates and derived gates.
7. XOR gate as comparator.
8. Study of Demorgan's Theorem.
9. Use of K map.
10. Ripple counter
11. Up/Down Counter synchronous.
12. Programmable counter
13. Decade Counter 7490
14. Shift Registers.
15. Combination of Logic gates.
16. Timing diagrams
17. Responses of NAND gate.
18. Assembly of OSC with gates.
19. Study of Decoder.
20. Synchronous decade counter.
21. Eight bit reversible counter.
22. Ring counter
23. Understanding Block diagram of a PC.
24. a) Study and verification of truth tables of AND, OR, NOR, NOT and NAND logic gates
b) Construct and test NOT and NAND gates using NOR logic.

25. Construct and test a full adder using IC logic blocks.
26. Construct and verify action of R-S flip-flop and D flip-flop.
27. Construct and verify action of T flip-flop and J-K flip-flop.
28. Construct and verify Johnson's Counter and Ring counter.

Course 3) How computers work. Theory Course (4CP)

1. Boot-up process
 - Getting to know the hardware
 - How a computer wakes up
 - How a disk boot works
 - How an operating system controls hardware
 - Computers of the next millenium
2. How software works
 - How programming languages work
 - How windows works
 - How software applications work
 - How software will work
3. Microchips
 - How a transistor works
 - How RAM works
 - How a microprocessor works
 - How microchips will work
4. Data Storage
 - How disk storage works
 - How a floppy drive works
 - How a hard drive works
 - How disk drives increase speed and storage
 - How removable storage works
 - How storage will work
5. Input/output Devices
 - How energy turns into data
 - How a bus works
 - How computer ports work
 - How a keyboard works
 - How a computer display works
 - How pointing devices work
 - How game controllers work
 - How a modem works
 - How scanners and optical character recognition work
 - How portable computers work
 - How high tech input/ output works
 - How input/output will work
6. Multimedia
 - How CD-ROM and DVD work
 - How multimedia sound works
 - How multimedia video works

7. How the internet works
 - How local area networks work
 - How a PC connects to the internet
 - How email works
 - How internet video and audio work
 - How the world wide web works
 - How the internet will work
8. How printers work
 - How basic printing works
 - How color printing works
 - How printers will work

Course 4) How computer are maintained? Theory (4CP)

- 1 Basic Computer Service Concepts
- 2 PC Architecture
- 3 PC Memory Architecture
- 4 Disk System Architecture
- 5 PC Bus Architectures
- 6 Peripheral Devices
- 7 How Printers Work
- 8 Networking Fundamentals
- 9 Installation and Upgrades
- 10 Troubleshooting Techniques
- 11 Introduction to Computer Operating Systems
- 12 Using the Microsoft Operating System GUI
- 13 Installing and Using Windows 95/98
- 14 Installing and Using Windows 2000 Professional
- 15 Application Installation and Configuration
- 16 Using and Configuring Additional Peripherals
- 17 Preventative Maintenance
- 18 Configuring Network Software
- 19 Windows and application Troubleshooting
- 20 USB

Course 5) Computer Maintenance Lab-1: Practical(4CP)

- Lab 1: Start Up, Navigate, and Shut Down a Windows System
- Lab 2: CMOS Setup
- Lab 3: Safely Open the Case to Identify Components
- Lab 4: Collect Resource Information – Windows 98
- Lab 5: Collect Resource Information – XP
- Lab 6: Collect Resource Information – Windows 2000
- Lab 7: Replace s Floppy Drive
- Lab 8: Replace the Hard Drive
- Lab 9: Add a Slave Drive
- Lab 10: Install a Windows Mouse
- Lab 11: Partition a Hard Drive – FAT32
- Lab 12 Partition a Hard Drive – Two Partitions-using FDISK

Lab 13: Partition HDD-NTFS(Win XP)
Lab 14: Replace a Power Supply
Lab 15: Remove and Insert Memory
Lab 16: Remove and Replace a Motherboard
Lab 17: Resolve an IRQ Conflict – Windows 98
Lab 18: Resolve an IRQ Conflict – Windows XP
Lab 19: Resolve an IRQ Conflict – Windows 2000
Lab 20: Troubleshoot Hardware Problems
Lab 21: Dual boot Windows XP and Windows 2000

Course 6) Computer Maintenance Lab-2: Practical(4CP)

Lab 22: Install an Operating System – Windows XP
Lab 23: Install an Operation System – Windows 98
Lab 24: Install an Operation System – Windows 2000
Lab 25: Customize the Windows Desktop
Lab 26: Use Files and Folders
Lab 27: Image and Replace a Windows 98 Hard Drive
Lab 28: Install and Launch Windows Applications
Lab 29: Install a CD-and DVD
Lab 30: Install a CD-ROM Drive – Windows
Lab 31: Install a Sound Card – Windows
Lab 32: Install a printer – Windows
Lab 33: Use scan disk and defrag -Windows
Lab 34: Create an ERD and Startup Disk – Windows 98
Lab 35: Create an ERD and Startup Disk – Windows NT 4.0
Lab 36: Create an ERD and Startup Disk – Windows 2000
Lab 37: Configure and Connect Dial-Up Networking
Lab 38: Configure a Peer-to-Peer Network
Lab 39: Troubleshoot Software
Lab 40: Scanner installation

Option 1: Windows 2000 Server

Course 7) Network Technologies, Theory

1. Windows 2000 Server overview
2. Getting comfortable with active directory
3. Installing Windows 2000 server
4. The Windows 2000 Server User Interface and Microsoft Management Console
5. Understanding the Registry Database
6. Installing Hardware in Windows 2000
7. Managing Windows 2000 storage
8. Managing and Creating User Accounts
9. Creating and Managing Shared Folders
10. Software Installation
11. Configuring and Troubleshooting Network Print Services
12. Connecting Clients to Windows 2000 server
13. Supporting Clients with Windows Terminal Services
14. How running a Big Windows 2000 Network Is Different

15. Integrating Netware with Windows 2000 server
16. Understanding and Using TCP/IP in Windows 2000 server
17. Building a Windows 2000 TCP/IP Infrastructure: DHCP, WINS, DNS, Sites and More
18. Internet Information Services in Windows 2000 server
19. Tuning and Monitoring Your Win2K Network
20. Preparing for and Recovering from Server Failures
21. Installing and Managing Remote Access Service in Windows 2000 server.

Course 8) Network Technologies, Practical

1. Building an Active Directory
2. Creating a New User Account in Active Directory
3. Setting Password
4. Installing Windows 2000 Server
5. Installing Windows 2000 Workstation with RIS
6. Adding and Subtracting Network Services
7. Adding New Hardware and Working with Device Manager
8. Setting up Password Policy
9. Fixing Windows 2000 GUI
10. Working with Microsoft Management Console Primer
11. Working with Registry
12. a) Installing new physical hard disk b) creating strip set, volume set and RAID5 volumes.
13. a) Creating and modifying users and groups b) Working with groups in Windows 2000
14. a) Working with group policies object b) Working with users profiles
15. Creating and managing permission for shared folder
16. Creating and managing DFS (Distributed File System)
17. Creating and managing Web share
18. a) Creating your own MSI b) Software distribution using ZAP files
19. Configuring and troubleshooting Network Print Services
20. Connecting Windows 95/98 Workstation
21. Integrating Netware and Windows 2000
22. Migrating from Netware and NDS to Windows 2000 and active directory
23. Installing TCP/IP on Windows 2000
24. Setting up Routing on Windows 2000
25. Configuring LAN to WAN and Routing with internet connection sharing
26. Installing and Configuring DHCP Server
27. Installing WINS and configuring Wins Server
28. Installing the DNS service with DNS manager
29. Installing E-mail Server
30. Installing Internet Information Services
31. Working with System Monitor and Event Viewer
32. a) Taking back-ups b) Creating and using emergency repair disk
33. Installing and Configuring RAS (Remote Access Services)
34. Implementing VPN

Option 2: Linux

Course 7) Networking Technologies, Theory

Preparation to install the Red Hat Linux (RH L)

Installing RH L

Post Installation configuration
First steps with RHL
The X Window system
Managing Services
Managing software and system resources
Managing users
Managing filesystems
Backing up, restoring and recovery
Printing services
Network connectivity
Managing DNS
Internet connectivity
Apache web server management
Administrating Database services in RHL
Secure FTP service
Handling e-mail
Office Productivity Application (Office Suites for Linux)
Multimedia Applications (Burning CDs in Linux, Sound and Music)

Course 8): Networking Technologies, Practical

The laboratory exercises would enable the students to:

Back up Red Hat Linux (RHL) system
Change a password
Change the date and time
Compress a file
Configure a modem
Configure a printer
Configure a sound card
Connect to the internet
Control a network interface
Copy and paste text
Copy files or directories
Create a boot disk
Create a data base
Create a user
Delete a file/directory
Edit a text file
Install/remove software
Install Linux
Log in to RHL
Make RHL more secure
Mount a CD ROM or HD drive
Partition a HDD
Print a file
Protect the PC on a network
Read a text file
Read and send e-mail
Reboot RHL
Rescue the system

Set up a dial in server
Set up a DNS server
Set up a firewall
Set up a web server
Set up a FTP server
Set up Samba with SWAT
Shut down RHL
Start an FTP server
Start a Web server
Use a database with RHL
Use the RHL desktop

Option 3: Windows 2003

Course 7): Networking technologies, Theory

Windows 2003 Server exploration
Migrating to Windows 2003 Server
Deploying Windows 2003 Server and Windows XP Professional
Installing Windows 2003 Server
Installing Windows XP professional
Remote Installation Services
Windows 2003 Server Networking Environment
Setting and managing a Network
Active Directory and Domains
Communication and internet services
Internet Information Services Version 06
Virtual Private Network
Terminal Services and Remote Desktop
Windows Server 2003 administration
Managing Windows 2003 Server
Security in Windows 2003 Server

Course 8):Networking Technologies, Practical

The Laboratory exercises would enable the students to:

1. identify the functions needed for a network environment.
(subtasks: subtasks: understand reasons for Windows server 2003, understand components of Windows server 2003)
2. decide whether to migrate to Windows server 2003.
(subtasks: subtasks : evaluate the size, hardware/software, networking environment, security demand of the organization to decide whether to migrate.)
3. complete an installation checklist
(subtasks: check system requirements, consider installation choices, prepare for installation, plan migration to Windows server 2003)
4. install Windows server 2003
(subtasks: choose setup method, run setup, configure the server)
5. install WINDOWS XP PROFESSIONAL
(subtasks: clean install from new version, character based setup, GUI based setup, run upgrade, automate installation, create/use images)
6. install, configure, test trouble shoot RIS
7. plan network

- (subtasks: define network, hardware, topologies, implement protocols)
- 8. ensure that the network is properly set up
(subtasks: set up network interface card, configure protocols, test network, setup DHCP, DNS and WINS, group permissions, user accounts)
- 9. implement Active Directory
(subtasks: install AD, replicate Ad among sites)
- 10. use communication among the computers
(subtasks: LAN) and connect to internet (subtasks: connect PCs with LAN, telephony connections, install/maintain Windows server 2003 router, internet connection, send/receive internet mail)
- 11. use IIS 6
(subtasks: install IIS 6, customize/maintain IIS 6)
- 12. install VPN
(subtasks: use PPTP, layer two tunneling protocol, setup VPN server/client)
- 13. use terminal services and Remote Desktop
(subtasks: setup terminal service, activate/install client licenses, use remote desktop for administration)
- 14. plan and use storage and file systems
(subtasks: Use disk management, dynamic volume management, distributed file system, distributed file system, backup/restore)
- 15. set up print and fax services
(subtasks: set up network printing, control que, manage fonts, set up fax service)
- 16. use control panel, task manager, MMC, registry, group policy, local user profiles and update Windows server 2003
- 17. plan and use security features (subtasks: authenticate users, control access, secure server data, private/public key encryption, secure data transmission)