CURRICULUM FOR
DIPLOMA IN COMPUTER HARDWARE & NETWORKING (HN)

SCHEME : C

DURATION: ONE YEAR **PATTERN:** SEMESTER

TYPE: PART TIME

ELIGIBILITY: 12th Science / Commerce / Arts, 12th MCVC, ITI (Electronics, Licentiate in Electronics & Radio Engineering (LERS), Licentiate in Advanced Electronics & Vedio Engineering (LAEVS). OR Higher

(To be implemented from the Academic Year 2008 – 2009)

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION. MUMBAI
(AUTONOMOUS)
ISO 9001-2001Certified
49, Kherwadi, Aliyawer Jung Marg, Mumbai – 400 051

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

TEACHING AND EXAMINATION SCHEME FOR DIPLOMA COURSES

COURSE NAME : DIPLOMA IN HARDWARE & NETWORKING

COURSE CODE : HN

DURATION OF COURSE : ONE YEAR/TWO SEMISTER **WITH EFFECT FROM 2008-2009**

SEMESTER : FIRST SEMESTER **DURATION: 16 WEEKS**

FULL TIME / PART TIME : PART TIME **SCHEME : C**

SR. NO	SUBJECT TITLE	SUBJET CODE	TEACHING SCHEME			EXAMINATION SCHEME											
			TH	TU	PR	PAPER HRS	TH		TEST	TOTAL		PR		OR		TW	
							Max	Min		Max	Min	Max	Min	Max	Min	Max	Min
1	Fundamentals of Computer Hardware	10393	3	--	4	3	80	28	20	100	40	--	--	50#	20	50@	20
2	Networking Essentials & Protocols	10394	3	--	2	3	80	28	20	100	40	--	--	50@	20	--	--
3	Network Operating System Administration	--	--	--	4	--	--	--	--	--	--	50#	20	--	--	50@	20
4	Development of Generic Skills	--	--	--	2	--	--	--	--	--	--	--	--	--	--	50@	20
	TOTAL		**6**	**--**	**12**	**--**	160	**--**	40	**200**	**--**	**50**	**--**	**100**	**--**	**150**	**--**

STUDENT CONTACT HOURS PER WEEK (FORMAL TEACHING) : **18 HRS.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

@ - INTERNAL ASSESSMENT, # - EXTERNAL ASSESSMENT, *- ON LINE EXAMINATION.

TOTAL MARKS – 500

ABBREVIATIONS: TH – THEORY, TU – TUTORIAL, PR – PRACTICALS, OR –ORAL, TW – TERMWORK.

Assessment of practical, oral and term work are to be done as per the prevailing norms for curriculum implementation and assessment.

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

TEACHING AND EXAMINATION SCHEME FOR DIPLOMA COURSES

COURSE NAME : DIPLOMA IN COMPUTER HARDWARE & NETWORKING

COURSE CODE : HN

DURATION OF COURSE : ONE YEAR /TWO SEMESTER **WITH EFFECT FROM 2008-2009**

SEMESTER : SECOND **DURATION: 16 WEEKS**

FULL TIME / PART TIME : PART TIME **SCHEME : C**

SR. No.	SUBJECT TITLE	SUBJET CODE	TEACHING SCHEME			EXAMINATION SCHEME											
			TH	TU	PR	PAPER HRS	TH		TEST	TOTAL		PR		OR		TW	
							Max	Min		Max	Min	Max	Min	Max	Min	Max	Min
1	Computer Hardware & Troubleshooting	10395	3	--	4	3	80	28	20	100	40	50#	20	--	--	50@	20
2	Network Operating System Infrastructure	10396	2	--	2	2	40	14	10	50	20	--	--	50@	20	--	--
3	Remote Network Administration	10397	2	--	2	2	40	14	10	50	20	--	--	50#	20	50@	20
4	Emerging Technologies & ED	--	1	--	2	--	--	--	--	--	--	--	--	--	--	50@	20
	TOTAL		**8**	**--**	**10**	**--**	160	**--**	40	**200**	**--**	**50**	**--**	**100**	**--**	**150**	**--**

STUDENT CONTACT HOURS PER WEEK (FORMAL TEACHING) : **18 HRS.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

@ - INTERNAL ASSESSMENT, # - EXTERNAL ASSESSMENT, *-ON LINE EXAMINATION.

TOTAL MARKS – 500

ABBREVIATIONS: TH – THEORY, TU – TUTORIAL, PR – PRACTICALS, OR –ORAL, TW – TERMWORK.

Assessment of practical, oral and term work are to be done as per the prevailing norms for curriculum implementation and assessment.

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : First

Subject Title : Fundamentals of Computer Hardware

Subject Code : 10393

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	--	04	03	80	20	--	50#	50@	200

Rationale:

This subject introduces the student to Computer Hardware Technology. This subject cover different types processors, motherboards, printers, monitors, etc..

Objective:

Student will be able to

- Identify different Motherboards
- Identify different types of Cables and Connectors, Power Supply and Display
- Appreciate structural differences between desktops and laptops

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
1	**Basics of Electricity & Electronics** 1.1 **Basic concepts of Electricity** – voltage, resistance, current, power, AC/DC, Using Digital Multimeter for measurement of resistance / voltage / current. 1.2 **Electronic Components** – resistor, capacitor, inductor, transformer, diode, transistors : their function, types, identification, etc.. 1.3 Testing Instruments, Integrated Circuits, PCB 1.4 Analog & Digital Signals, Numbering Systems (binary & hexadecimal), ASCII Codes, BCD. Functional description of gates, Flip-flop (RST, D, JK), Registers, Multiplexers / Demultiplexers, Encoder/Decoder, ADC/DAC, Counter, Adder, Subtractor, Parity Generator/Checker, Basics of Semiconductor memories (Different types of RAM / ROM), Timing Circuits, Electronic Display (7 segment, LED, LCD, Plasma, LED matrix) **Note:** For point 'd' only block level explanation is expected.	**14**	**16**
2	**Elements of Computers** 2.1 Introduction to Microprocessor 2.2 Block diagram of a computer 2.3 History of computers 2.4 Classification 2.5 PC Architecture 2.6 Types of Processors and their specifications (Intel: Celeron, P4 family, Xeon, and AMD) (8085 programming not expected)	**08**	**16**

3	3.1 **Mother Board & Components** Types, Form factor, Different Components of Mother Boards (I/O slots, I/O connectors, CMOS battery, RTC, Memory Socket, BIOS, Front Panel Connectors), Types of Buses, compatibility with the processor ,SATA interface 3.2 **System Resources** IRQ, DMA, Memory Address, I/O address, Resource Conflict, Plug & Play Concept 3.3 **CMOS Utility** Concept, CMOS RAM, CMOS Battery, backup, CMOS Utility Program menu, Clearing CMOS	**08**	**16**
4	**Add on Cards, Cables & Connectors** Different latest Add on Cards – (Identification in terms of I/O slot and connectors) (AGP, PCI Express, TV Tuner Card ,DVR card, Video Capture, SCSI. USB, NIC, Firewire, Internal Modem, Sound Card)	**04**	**06**
5	**Display Systems** Types of VDU, (CRT, LCD, TFT), Terms like Resolution, Dot Pitch, Interlaced & Non Interlaced Power Consumption, Durability, Specification, Installation	**04**	**06**
6	**Drives** 6.1 **Floppy Disk Drive** :Floppy Drive, Components (Read / Write Head, Spindle Motor, Head Actuator, Sensors, Connectors), Preventive Maintenance, Trouble Shooting 6.2 **Hard Disk Drive** : Types, capacity, Hard Disk Drive Component (Media, R/W Head, Spindle Motor Head Actuator) Connectors, Jumper setting, HDD Specification (Head, Cylinder, Sector, Model Number, Firmware Number), configuration of HDD in, CMOS/BIOS setup, partitioning, Formatting, Writing Format, File Format (FAT, NTFS, Ext.3 for LINUX), type of interface, Preventive Maintenance (S/W, H/W), trouble Shooting (H/W, S/W Recovery, Zero fill) 6.3 **Optical Disk Drive**: Types (ROM, R/W, DVDROM, DVD	**10**	**20**

	R/W), Capacity, Drive Components (Connectors, Motors, Sensors, Lence, Jumper Setting) CD ROM Drive / Disc. Format (ISO9660, high Sierra), Difference between CD & DVD (Capacity, format), Interface (IDE, SCSI, USB) 6.4 **Back up Drive**: Pen Drive U3 format, Zip Drive, Tape Drive, USB External Drive (HDD, CD/DVD writer), Types, capacity, interface connector, write protection, Trouble Shooting, Introduction of Magneto-Optical Drive, Interface, Installation, casing for external drive		
	TOTAL	**48**	**80**

List of Practicals:

1. Using Testing Instruments like multimeter, Oscilloscope.
2. AC / DC Voltage measurement.
3. Identify & test different types of Resistor, Capacitor, Coils & Transformer.
4. Identify & test different types of Diodes, transistors.
5. Transistor as a Oscillator – sine wave/sq.wave.
6. Verify truth-table of Gates, Flip-Flops.
7. Verify functioning of Counters, Registers.
8. Verify functioning of ADC / DAC.
9. Verify functioning of Adder - Half & Subtractor – Half using discrete gates.
10. Draw Layout & understand internal parts of Computers Desktop & Laptop.
11. Identify different types of Processors, Cables, Connectors used in Computer.
12. Draw layout & understand sections of Motherboards & Add on Cards.
13. Configuring important parameters of CMOS Setup utility, BIOS update.
14. Identify different types of Drives & understand internal mechanism of the same (FDD, HDD, CDO, Zip, Pen,SCSI Drive).
15. Installation of SCSI Drive, Optical Drives (CDR, DVRW).
16. Installation of OS Single, Partitioning, Formatting.
17. Installation of OS Dual.
18. Surveillance using DVR Card, Camera and Accessories – DEMO.

FOR Chapter NO 2, the faculty should download pages from INTEL & AMD Website, and Present information to the students on the latest processors etc available on the site. Parameters- CPU model No, CPU FSB, Cache memory, Clock Speed, type of Socket etc.

Learning Resources:

Sr. No.	Author	Title	Publisher
01	V.R.Mehta	Principles of Electronics	S.Chand & Co Ltd.
02	Malvino & Leach	Digital Principles & Applications	--
03	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
04	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	BPB Publication
05	5D. Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill
06	Scott Mueller	Upgrading & Repairing PCs	Pearson Education

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : First

Subject Title : Networking Essentials & Protocols

Subject Code : 10394

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	---	02	03	80	20	---	50@	---	150

Rationale:

This subject introduces the student to the world of networking. Before one learns the technology of networking it is essential that the student has thorough understanding of various terminologies, and concepts. He gets introduced to network topologies, architectures, protocols, devices, etc.

Objectives:

The student will be able to:

- Understand need and advantages of computer networking.
- Understand Architecture & Topology of network.
- Understand framework of different layers of communication between computer systems.
- Understand Protocols and Devices used in networking.
- Understand IP Addressing.
- Understand typical problems and troubleshooting approaches.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	**Introduction** 1.1 Need for networking 1.2 Types of networks 1.3 Network Architectures 1.4 Network Topology 1.5 Network Media 1.5.1 Cable media 1.5.2 Structured Cabling 1.5.3 Wireless media 1.6 Network Management & Security	**06**	**12**
02	2.1 **The OSI Model** 2.1.1 Seven Layers & their Functionalities 2.2 **LAN Protocols** 2.2.1 Classification 2.2.2 Examples of protocols 2.2.3 Ethernet networking - Half Duplex - Full Duplex - Ethernet Addressing - Ethernet Frames 2.3 **WAN Protocols** - PPP, X.25, PPTP, L2TP, ISDN, ATM	**05**	**12**
03	3.1 **LAN Connectivity Devices** 3.1.1 NIC 3.1.2 Repeater 3.1.3 Hub 3.1.4 Switch 3.1.5 Bridge 3.2 **Internetwork Connectivity Devices** 3.2.1 Routers 3.2.2 Gateways 3.2.3 CSU/DSU	**05**	**16**
04	4.1 **TCP/IP Protocol Suite** 4.1.1 What is TCP/IP 4.1.2 Importance of TCP/IP 4.1.3 OSI Vs. TCP/IP Reference Models 4.1.4 Internet Layer Protocols – ARP, ICMP, IGMP, IP 4.1.5 Transport Layer Protocols – TCP, UDP 4.1.6 Application Layer Protocols – FTP, Telnet, SNMP	**08**	**12**

05	5.1 **IP Addressing** 5.1.1 Overview 5.1.2 Address Classes 5.1.3 Network ID, Host ID and Subnet Mask 5.1.4 Addressing Guidelines 5.1.5 Reserved IP Addresses 5.2 **Subnetting and Supernetting** 5.2.1 Overview 5.2.2 Defining Subnet Ids 5.2.3 Supernetting	**12**	**16**
06	6.1 **TCP/IP Utilities** 6.1.1 PING 6.1.2 IPCONFIG 6.1.3 HOSTNAME 6.1.4 ROUTE 6.1.5 TRACERT 6.2 **Installation and Configuration of TCP/IP Protocol**	**12**	**12**
	TOTAL	**48**	**80**

Practical:

List of Practical:

- Study of Hardware Component used in Networking.
- Crimping of UTP Cable, Patch Panel Punching, Junction I/O Boxes.
- Installation of Network Interface Card (NIC).
- Peer-to-Peer Networking & Working in Peer-to-Peer Environment.
- Sharing Resources, Accessing Shares and Share Level Security.
- Troubleshooting (Cable Connectivity, Upgrading NIC Driver Software).
- Installation of Wireless Devices -LAN Card, Router, Access Point.
- Identifying valid IP Addresses, Defining Subnet Ids and Host Ids.
- Using TCP/IP Utilities & Commands (PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT, ARP, FTP, Telnet).
- Study of TCP/IP Configuration Settings on Windows XP System.

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Learning Resources:

Books:

Sr. No	Author	Title	Publisher
1	Richard McMohan	Introduction to Networking	Tata McGraw Hill
2	Forouzon	Local Area Networks	Tata McGraw Hill
3	Chris Clerk	Network Cabling Handbook	Tata McGraw Hill
4	A. S. Godbole	Data Communication & Networking	Tata McGraw Hill

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : First

Subject Title : Network Operating System Administration

Subject Code :

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
--	--	04	--	--	--	50#	--	50@	100

Rationale:

A network operating system software provides features to connect different hosts to share data and resources across the network. Understanding of these features to be able to install and configure N.O.S. and to be able to support and troubleshoot is of utmost importance for anyone wanting to work as network administrator.

Objectives:

The student will be able to:

- Understand features of Windows XP Professional and Windows Server 2003 Network Operating Systems
- Install Windows XP Professional and Windows Server 2003 NOS
- Create Users and Groups and manage access to resources
- Install and manage Printers
- Manage Disks and take care of Disaster Recovery
- Install Terminal Services for Remote connection

Contents: Theory

Note: Related theory for Practical to be covered during the Practical Hours

Chapter	Name of the Topic
01	**Introduction** 1 .1 MS Windows Operating Systems 1.2 Features of Windows XP Professional
02	**Installing MS Windows XP Professional** 2.1 System requirements 2.2 Using Remote Installation Services 2.3 Using System Preparation Tool 2.4 Create unattended answer files to automate the installation
03	**Administering Users and Groups** 3.1 Creating user accounts 3.2 Configuring user account properties 3.3 Implementing security for user accounts 3.4 Creating Groups (Local and Domain) 3.5 Configuring Group membership 3.6 User Profiles
04	**Administering Access to Resources** 4.1 Features of NTFS File system 4.2 NTFS File & Folder Permissions 4.3 Assigning and Modifying Permissions 4.4 Creating and managing Shares 4.6 Introduction to Encrypted File System
05	**Administering Printers** 5.1 Installing and Managing Printers 5.2 Configuring Printers 5.3 Internet printing
06	**Monitor, Manage and troubleshoot access to Files and Folders** 6.1 Configure file compression 6.2 Control access to files and folders using permissions 6.3 Optimize access to files and folders
07	**Monitoring Performance and System Events** 7.1 Using Task manager and Event Viewer 7.2 Using System Monitor and Performance Logs

08	**Installing MS Windows Server 2003** 8.1 System requirements 8.2 Installation procedure 8.3 Windows Server 2003 Boot Process
09	**Disc Management** 9.1 Physical Discs – understanding ARC Path Designation 9.2 Basic vs. Dynamic Disks 9.3 Disk Management Tools and Tasks 9.4 Concept of RAID
10	**Administering Disaster Recovery** 10.1 Need and Types of Backup 10.2 Using Backup Utility 10.3 Scheduling Backups 10.4 Restoring Data 10.5 Troubleshooting Boot Failures 10.6 Automated System Recovery (ASR)
11	**Installing and Configuring Terminal Services** 11.1 Terminal Services Overview 11.2 Remote Desktop Connection

Practical:

Skills to be developed:

Intellectual Skills:

- To be able to set up a network using Windows XP and Windows Server 2003 NOS
- To be able to perform the administrative tasks like user creation, providing access to network resources, backing up of data, etc
- To be able to provide support for implementing, maintaining and troubleshooting MS Windows XP and Server 2003 based networks

Motor Skills:

List of Practical:

It is expected that students perform at least 10 experiments from the following list.

1. Installation of Windows XP.
2. Configuring Hardware Profile.
3. Creating Users and Groups and setting their properties.

4. Configuring Roaming and Mandatory User Profiles.
5. Creating and Managing Shares.
6. Study of AGP Process.
7. Study of NTFS Permissions.
8. Study of Encrypted File System.
9. Study of File Compression.
10. Study of Event Viewer, Task Manager.
11. Study of System Monitor & Performance Log.
12. Installing Local and Network Printer and set priority.
13. Installation of Windows Server 2003.
14. Study of Disk Management & Implementing Disk Quotas.
15. Study of Backup, Restore and Automated System Recovery.
16. Installing and Configuring Terminal Services & RDP.

Learning Resources:

Books:

Sr. No	Author	Title	Publisher
1	Brian Culp, Mike Harwood, Jason Berg	MCSE 4-in-One Study System	Dreamtech Press, New Delhi
2	Walter Glenn	Self Paced Training Kit – Supporting Users and Troubleshooting Desktop Applications on Windows XP OS	Microsoft Press
3	Sharon Crawford	Microsoft Windows Server 2003 Administrator's Companion	Microsoft Press

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : First

Subject Title : Development of Generic Skills

Subject Code :

Teaching Scheme			Examination Scheme					
TH	**TU**	**PR**	**TH**	**TEST**	**PR**	**OR**	**TW**	**TOTAL**
--	--	02	--	--	---	--	50@	50

Rationale:

At the end of the course, the student is expected to join an organization as a Hardware and Networking engineer or start his own business. Whatever he decides to do, it is essential that he sets goal, understands his weaknesses and strengths, and understands about stress, health, teamwork, and time management. This will equip him with knowledge which will aid him in achieving his goal. For this field it is essential that the student develops habit of market survey, to keep himself well informed about markets. Proper Listening and comprehension are basic essentials for growth in any career.

Objectives:

- To set short term and long term goals
- To understand how to improve upon one's weaknesses
- To consciously avoid wasting time, avoid bad food habits
- To be a good team member
- To hone listening and understanding skills.

Contents : Theory

Chapter	Name of the Topic	Hours
1	**Goal setting :** Concept, Setting short term and long term goals for the student himself. The student is expected to make a small write up.	2
2	**SWOT Analysis of the Self :** Understanding strengths, weaknesses, opportunities and threats in relation to the short term/long term goals set by the student for himself	4
3	**Time Management :** Importance, process of time planning, urgent vs. important, factors leading to time loss and ways to handle it, tips for effective time management. Student should be asked to write daily routine, and made to realize the places of time loss, and ways to handle it	4
4	**Stress management :** Concept, causes , effects, remedies to minimize/avoid stress	2
5	**Health :** Importance, Dietary Guidelines and exercises. Here eg. The student can keep3/4days diary of food eaten and made to analyze his eating habits	2
6	**Working in Teams :** Understand and work within the dynamics of a group Tips to work effectively in teams, Tips to provide and accept feedback in constructive way Leadership in teams, Handling frustrations in groups	2
7	**Market Survey :** A group of 4 students should visit exhibition/market and make report on a subject related topic class	6
8	**Seminar presentation :** The Group of 4 atudents should present in front of the class the report of market survey using OHP,LCD Projector	6
9	**Listening :** Difference between hearing and listening, importance of proper listening. (An exercise can be given where the teacher reads out a 2 page (300 words) passage, and students asked to write answers to simple questions.)	2
10	**Comprehension :** A technical article of around 300 words be given, and asked to write answers to simple questions.	2
	TOTAL	**32**

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : Second

Subject Title : Computer Hardware & Trouble Shooting

Subject Code : 10395

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS.	TH	TEST	PR	OR	TW	TOTAL
03	--	04	03	80	20	50#	--	50@	200

Rationale:

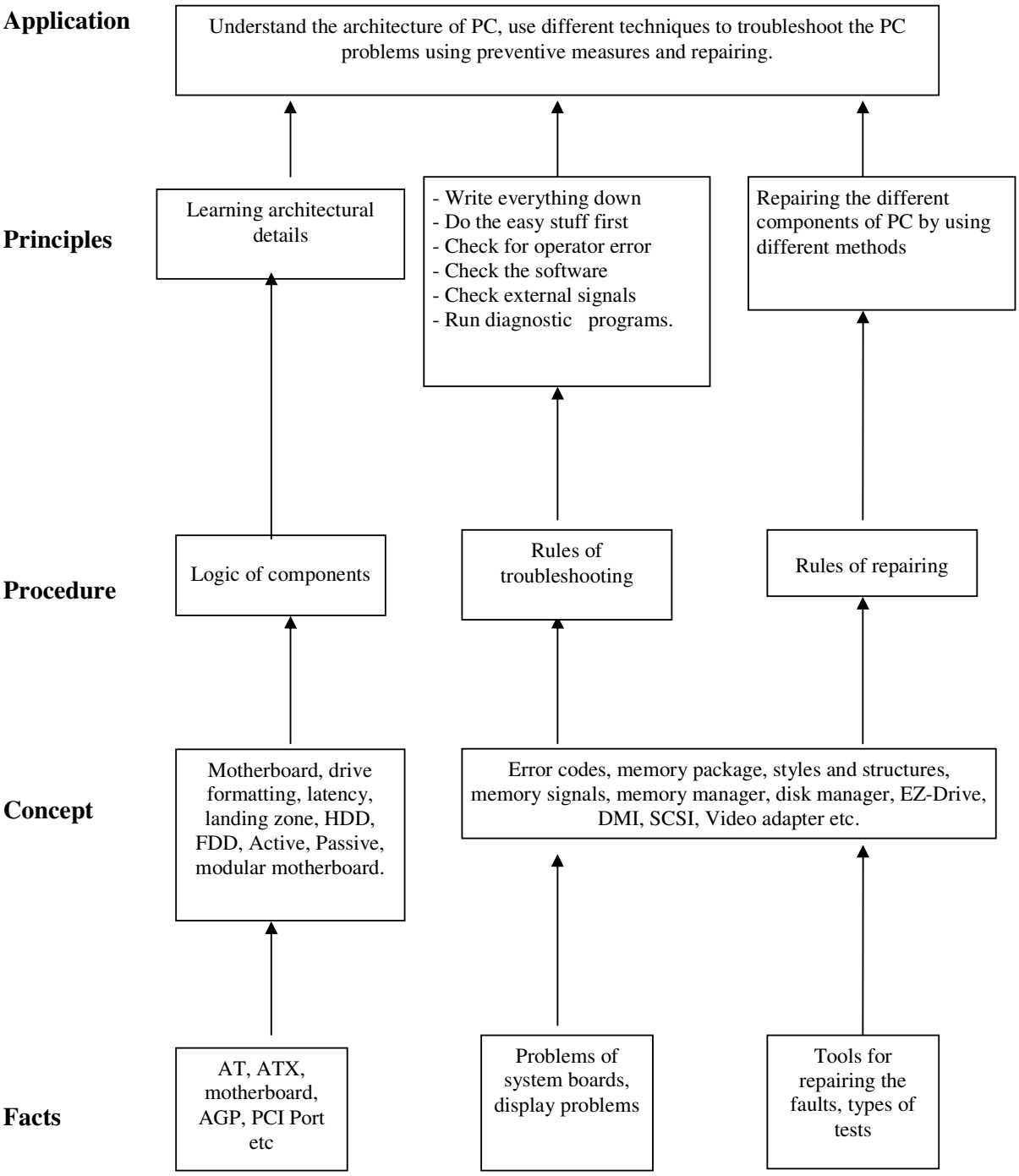
This subject is very practical oriented with focus on skills required to work as a field engineer independently. He should also be able judge the utility of different Hardwares available in market.

Objective:

The student will be able to:

1. Assembly of Computers
2. Interfacing 1/0 devices
3. Installation of OS & Application Softwares
4. Preventive Maintenance, Upgradation etc..
5. Debugging Computer Systems – Desktops & Laptops.
6. Market Survey.

Learning Structures:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
1	**Memory** Memory requirement, memory mapping (Base Memory, Upper Memory, Extended, Expanded, Shadowing, Types of RAM Modules, (Capacity, Speed, Pin Numbers) Cache Memory, CMOS RAM,SDRAM/DDR/DDR2?DDR3,FBD/ECC/ECC Register.	**06**	**10**
2	**I/O Devices** 2.1 **Keyboard** :- Interfacing (DIN, DS/2, USB, Wireless), Types of Keys, Keyboard Matrix, key Bouncing, Types of Keyboard (Simple, Multimedia), Preventive maintenance, Trouble Shooting. 2.2 **Pointing Device** :- Types of Pointing Device (Optomechanical, Optical Touch Pad, Track Ball), Interface (Serial, PS/2, USB, Wireless), Preventive maintenance, Trouble Shooting, Working Principle. 2.3 **Scanner** :- Types of Scanner (Barcode, Handheld, B/W, Color, Flat Bed), Interface (Parallel, SCSI, USB), Scanner Mechanism, Working Principle, Preventive Maintenance, Trouble Shooting, Specifications 2.4 **Web Camera** :- Interface, Working Principle, Specification, Application, Trouble Shooting 2.5 **Printer :-** Types of Printers, (DMP, Deskjet, Laser) Interface, Installation, Specification, Common Problems, Preventive Maintenance., working of Printer 2.6 **MODEM and Broadband Router**	**16**	**20**
3	**Installation of System** Hardware requirement for assembling, Systematic Procedure for assembling a system should be explain, Precautions taken during assembling, Precautions taken during Installation of System (Earthing of AC supply, Working Space, Air Cooling, Vibrations, Moisture)	**04**	**10**

4	**Power Conditioning Devices** **4.1 SMPS** Block diagram, Basic Principles & Operation, O/P Voltage, Capacity, Cable Color Code, Connector & Power Good, Common Faults (No Ckt. Diagram to be discussed) **4.2 UPS** Types of UPS, (ON line, OFF line, Hybrid), Factors for Selecting UPS, Installation of UPS H/W & S/W, Specification, Preventive Maintenance, Stabilizer, Spike Guards	06	10
5	5.1 **Debugging Desktop & Laptop** 5.1.1 Error, Beep Codes, Error Messages, POST 5.1.2 Faults related to H/W 5.1.3 Faults related to S/W 5.2 **Preventive Maintenance & Upgrading** 5.2.1 **Preventive Maintenance** :- Tools required, Active & Passive Maintenance, Types of Diagnostic Software Preventive Maintenance Schedule 5.2.2 **Upgrading of System** :- Mother board, Memory, CPU, Graphic Card, BIOS upgradation, Additional features, Updating of System Software & Application Software (Requirement & How to update)	12	26
6	**Viruses & Vaccines** 6.1 **Virus** :- Introduction, Infection methods, Types of Viruses, Different Symptoms of Virus attack 6.2 **Vaccines** :- Method of Vaccines, Different Types of Antiviruses used in PC updating of Antivirus **Demo to be given for updating of antivirus software**	04	04
	TOTAL	**48**	**80**

Note:

- **Wherever possible, the actual device such as web cam, printer, scanner should be taken to the class.**
- **Device related faults to be covered while teaching the device.**

List of Practicals

- Study of Memories (Different types)
- Study of Keyboard (Different types), Mouse
- Study of Printer (Different types)

- Assembly of Computer System
- Study & Installation of Scanner, Camera
- Installation of Drivers (I/O Devices)
- Installation of Printer
- Installation of Antivirus
- Study of different types of Power Supply used in Computers
- Study of OS Tools, and Diagnostic Tools
- Debugging- HARDWARE- Ethernet Card, Memory, CPU
- Debugging- HARDWARE- Display, Keyboard, Mouse
- Debugging- SOFTWARE- OS / Antivirus / MS-Office related
- Debugging- CD/DVD Burning related
- Installation of Wireless Devices (Keyboard, Mouse)
- Study of Blue Tooth Device, Card Reader
- Installation of MODEM & Broadband Router
- Market Survey

Learning Resources:

Books:

Sr. No	Author	Title	Publisher
01	Mike Meyers, Scott Jernigan	Managing & Troubleshooting PCs	Tata McGraw Hill
02	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
03	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	BPB Publication
04	D. Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill
05	Scott Mueller	Upgrading & Repairing PCs	Pearson Education

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : Second

Subject Title : Network Operating System Infrastructure

Subject Code : 10396

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
02	--	02	02	40	10	--	50@	--	100

Rationale:

The network operating system provides different networking services and directory services for better network performance. This subject covers the study of these services so that the student becomes equipped to handle larger networks.

Objectives:

The student will be able to:

- Install and configure networking services like DNS, DHCP, RRAS, IAS offerred by Windows Server 2003.
- Understand importance of Network security and how to implement it in a Windows. environment
- Install and configure Windows server 2003 Active Directory Services and Group policies.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	1.1 **Installing and Configuring DNS Services** 1.1.1 Name resolution – Host names, NetBIOS names 1.1.2 DNS Overview 1.1.3 Installing DNS Server 1.1.4 Configuring DNS Zones, DNS Clients, Delegating Zones 1.1.5 Testing DNS with nslookup, dnscmd and dnslint 1.2 **Installing and Configuring DHCP Services** 1.2.1 DHCP Overview 1.2.2 DHCP Clients and Leases 1.2.3 DHCP Server Configuration	**06**	**10**
02	**Routing and Remote Access** 2.1 Remote Access Overview 2.2 Configuring RRAS 2.3 VPN 2.4 Configuring Remote Access Authentication Protocol 2.4 Configuring RRAS Policies 2.5 Configuring IAS 2.6 Managing TCP/IP Routing	**06**	**06**
03	3.1 **Managing Network Security** 3.1.1 Security Baseline Settings and Templates 3.1.2 Configuring Audit Policy 3.1.3 Monitoring and Troubleshoot Network protocol 3.1.4 Understanding IPSec 3.1.5 Configuring Protocol Security 3.1.6 Planning security for Wireless Network 3.2 **Maintaining Network Infrastructure** 3.2.1 Monitor Network Traffic 3.2.2 Troubleshoot Internet Connectivity Troubleshoot Server Services	**06**	**06**
04	4.1 **Windows 2003 Active Directory Services** 4.1.1 ADS Overview 4.1.2 ADS Database	**06**	**08**

	4.1.3 Active Directory Namespace 4.1.4 Installing & Setting up Active Directory 4.2 **Planning and Implementing ADS Infrastructure** 4.2.1 Logical Elements of AD 4.2.2 Implementing AD Services 4.2.3 Physical Elements of AD		
05	5.1 **Planning and Implementing User and Group Strategies** 5.1.1 Adding Account 5.1.2 Planning Security Group Strategy 5.1.3 AGDLP Process 5.1.4 Planning User Authentication Strategy 5.1.5 Planning and Implementing OU Structure 5.2 **Planning and Maintaining Group Policies** 5.2.1 Planning a Group Policy Strategy 5.2.2 Configuring User Environment 5.2.3 Configuring Computer Security 5.2.4 Deploying Software Through GPO	**08**	**10**
	TOTAL	**32**	**40**

Practical:

List of Practical:

It is expected that students perform at least 10 experiments from the following list

- Installing and Configuring DNS Services (2 Practicals)
- Installing and Configuring DHCP Server Services
- Installing and Configuring Remote Access Services
- Configuring NAT, ICS
- Configuring VPN
- Implementing and Monitoring IPSec
- Installing and Setting up ADS, Delegation of Control
- Study of AGDLP Process
- Creating Forest, Domain and Tree (ADS Logical Element)
- Creating Site and Site Link (ADS Physical Element)
- Study of ADS Commands (*dsadd, dsmod, dsmove, dsrm, movetree*)
- Configuring Group Policy, Assigning and Publishing Objects using GPO

Learning Resources:

Books:

Sr. No	Author	Title	Publisher
1	Brian Culp, Mike Harwood, Jason Berg	MCSE 4-in-one Study System	Dreamtech Press, New Delhi
2	Jill Spealman, Kurt Hudson, Melissa Craft	MCSE Self-Paced Training Kit (Exam 70-294): Planning, Implementing, and Maintaining a Microsoft® Windows Server™ 2003 Active Directory® Infrastructure	Microsoft Press
3	Greg Bott; Lab Manual: Michael D. Hall and Tony Smith Pages 576	Implementing, Managing, and Maintaining a Microsoft® Windows Server™ 2003 Network Infrastructure (70-291)	Microsoft Press

Course Name : Diploma in Computer Hardware & Networking

Course Code : HN

Semester : Second

Subject Title : Remote Network Administration

Subject Code : 10397

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
02	--	02	02	40	10	--	50#	50@	150

Rationale:

In today's world, networks are growing by interconnecting the networks across the globe. The importance of remote network administration thus can not be overlooked. This subject introduces the concept of inter-networking, and routing and how the same can be implemented with routers and switches. The practical knowledge of installation and configuration of routers and switches would make the student capable of supporting larger networks.

Objectives:

The student will be able to:

Assemble and Cable inter-networking devices like Cisco Routers and Switches.

Configure Cisco Routers and Switches.

Configure Virtual LAN.

Manage Cisco Internetwork.

Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	1.1 **Internetworking** 1.1.1 OSI Model 1.1.2 Ethernet Networking 1.1.3 Data Encapsulation 1.2 **Cisco Three-Layer Model** 1.2.1 Core Layer 1.2.2 Distribution Layer 1.2.3 Access Layer 1.3 **Assembling and Cabling Cisco Devices** 1.3.1 Cabling Ethernet LAN 1.3.2 Cabling WAN - Serial Transmission - DTE/DCE - Fixed and Modular Interface - ISDN Connection 1.3.3 Cisco Products - Hubs, Switches, Routers	**04**	**08**
02	**Switching Technologies** 2.1 Layer 2 Switching 2.2 Spanning Tree Protocol (STP) 2.3 LAN Switch Types	**04**	**06**
03	3.1 **Configuration and IOS Commands** 3.1.1 Cisco Router User Interface 3.1.2 Command Line Interface 3.2 **IP Routing** 3.2.1 IP Routing Process 3.2.2 IP Routing in Network 3.2.3 RIP 3.2.4 IGRP 3.2.5 Verifying Configuration	**16**	**16**
04	**Virtual LAN** 4.1 Overview of Virtual LAN 4.2 VLAN Memberships 4.3 Identifying VLAN 4.4 Trunking 4.5 VLAN Trunk Protocol (VTP)	**04**	**04**
05	5.1 **Managing Cisco Internetwork** 5.1.1 Router Boot Sequence 5.1.2 Internal Components of Router	**04**	**06**

	5.1.3 Backup and Restore 5.2 **Managing Traffic with Access Lists** 5.2.1 IP Access Lists 5.2.2 Monitoring Access Lists		
	TOTAL	**32**	**40**

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Practical:

List of Practical:

It is expected that students perform at least 8 experiments from the following list

- Basic Router CLI Commands.
- Router Configuration.
- Router CDP, Trace, Ping, TFTP, Backup IOS and Configuration.
- Switch Configuration.
- Configuring VLAN, VTP.
- Configuring RIP, IGRP, EIGRP, OSPF Protocols.
- Configuring IP Access List.
- Point-to-Point Configuration.
- Configuring Frame Relay.
- Configuring ISDN.
- Multiple Routers Scenario based Practical.

Learning Resources:

Books:

Sr. No	Author	Title	Publisher
1	Todd Lammle	CCNA EXAM 640-802 Cisco Certified Network Associate 3/E (Book/CD)	Wiley India Pvt. Ltd/Sybex
2	Richard Deal	CCNA Cisco Certified Network Associate Study Guide (EXAM 640-801)	Tata Mcgraw-Hill Publishing Company Ltd

Course Name : **Diploma in Computer Hardware & Networking**

Course Code : **HN**

Semester : **Second**

Subject Title : **Emerging Technologies & ED**

Subject Code : **--**

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
01	---	02	---	---	---	---	---	50@	50

Rationale:

The technology is developing at phenomenal speed. It is necessary that the student is aware of the emerging technologies in the area of hardware and networking technology. The various topics included in the subject give the student a glimpse of the future trends and will help imbibe curiosity in him.

After completion the student will either take up a job or enter business. It is essential that he understands his own strengths and weaknesses, how to dress up for interview, how to prepare his biodata, what are the common questions asked at the interview etc.. If he is planning to start his own business, he needs to know basics of forms of ownerships, understand concepts of finance, and he should be able to fill the loan application form.

Objectives:

The student will be able to:

- Relate himself with the advancing technology
- Confidently face the interview
- Prepare loan application to Bank
- Understand importance of health, time management
- Understand importance of Team Spirit & Customer Service.

Contents: Theory

Chapter	Name of the Topic	Hours
01	**Wireless Technology** 1.1 Bluetooth 1.2 Zigbee 1.3 3G 1.4 WAP 1.5 WiMAX	**03**
02	**Mobile Technology** 2.1 GSM 2.2 CDMA 2.3 TDMA 2.4 GPRS	**02**
03	**Triband / Broadband Technology** 3.1 Net Telephony 3.2 Leased Lines 3.3 ISDN	**02**
04	**VSAT and GPS**	**01**
05	5.1 **Forms of Ownership, Partnership, Proprietorship, Pvt. Ltd., Public Ltd.** 5.2 **Basics of Finance** Concept of Budgeting, Types of Budgets 5.3 **P/L A/C, Break even Point, Cash Flow, Working Capital Calculation** 5.4 **Loan Application to a Bank**	**03**
06	6.1 Time Management 6.2 Health Management 6.3 Stress Management 6.4 SWOT Analysis 6.5 Customer Service	**03**
07	**Interview Techniques** 7.1 Biodata Preparation 7.2 Self Presentation – Dressing, Voice, Tone, Pitch, body language 7.3 Tips for Common Interview, Mock Interviews	**02**
	TOTAL	**16**

Practical: Note: Minimum 7 Assignments based on above topics for Term Work

List of Equipment:

For Hardware:

Digital Multimeters – 4 nos.

Different types of Resistors

Different types of Capacitors

Different types of Transformers & Coils

Different types of Diodes & Transistors

Board for testing of different Gates (NOT, AND, OR)

Board for testing of different Flip-flops (RS, D, JK)

Board for testing of Counters & Registers

2 Sets of different Motherboards (latest type)

2 Sets of Different add-on cards like TV Tuner card, PCI Express card, DVR card

Different types of Memories

P4 Computer Systems – 6 Nos. + 2 spare (with 3 students per computer for practical)

Different monitors like LCD, CRT, TFT (at least one each)

Different types of SMPS (AT, ATX – 20 pin, ATX – 24 pin)

Modems (Internal & External – one each)

Broadband Router

Different types of Drives (HDD – IDE, SATA, & SCSI, Floppy Drive, CDROM, CDWriter, DVDROM, DVDWriter, Pen Drive)

Scanner – 1 no.

Web Camera – 1 no.

Printers (Dot Matrix, Inkjet, Laser – 1 each)

Laptops – minimum 2 nos.

UPS – 1 no.

Stabilizer – 1 no.

Different Cordless Devices like Keyboard, Mouse, Lan Card, etc.

Bluetooth device such as Bluetooth enabled Mouse, Mobile phones

Card Reader

For Networking:

- Computer Systems P4 (with minimum 512 MB RAM, 40/80 GB HDD, CDROM, KB, Mouse, Network Interface) ------ 10 numbers minimum
- Switch/ Hub to connect all Computer systems in LAN

- Minimum 2 Computer Systems to have 1 additional Network Interface (For the Routing practical)
- Minimum 1 Computer System to have 3 HDDs (for Disk Management practical)
- Modem
- Cat 5 Crimping tool, wire cutter, punch down tool (for Crimping practical)
- Cat 5 UTP Cable, RJ45 Connectors (for Crimping practical)
- Cable tester
- Standard Patch Panel
- Cisco 2500 series Routers with accessories like console cable, transceiver, V35 Cable, etc: 2 - 3 Nos.
- Cisco c2950-24 Port Switch with accessories like console cable.

List of Software:

1) DM Utility
2) MS Windows XP
3) MS Windows Server 2003
4) MS Office
5) Other Applications like Page maker, some games, etc
6) Cisco IOS CD, if available
7) Antivirus program
8) Driver CD for Motherboard, CDROM & other devices