

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION,  
MUMBAI - 51**

1	Name of Course	<b>Certificate Course in Computer Networking (101144)</b>																																									
2	Max. Nos. of Student	25 Students																																									
3	Duration	6 Months																																									
4	Type	Full Time																																									
5	Nos. of Days / Week	6 Days																																									
6	Nos. of Hours /Days	7 Hrs																																									
7	Space Required	Theory Class Room – 200 sqft Practical – 1000 sqft																																									
8	Entry Qualification	S.S.C.																																									
9	Objective Of Syllabus/ introduction	Awareness of Safety precautions. Knowledge of soldering techniques, Testing, use of tools in assembly. Repair & Maintenance Computer Hardware & Networking Application of Various Networking types. Crimping of various Networking Cables & Networking Components Ability to read schematic layouts wrings diagrams. Configuring Networking Rights. Testing of Wi-Fi Networking.																																									
10	Employment Opportunity	The trainee will either to be able to take up jobs with agencies which maintain and repair such equipments or with working experience will be in a position to start his own independent Business.																																									
11	Teacher’s Qualification	Diploma in Computer Engineering.																																									
12	Training System	<table><tr><th colspan="7">Training System Per Week</th></tr><tr><td colspan="2">Theory</td><td colspan="2">Practical</td><td colspan="3">Total</td></tr><tr><td colspan="2">18 Hours</td><td colspan="2">24 Hours</td><td colspan="3">42 Hours</td></tr></table>							Training System Per Week							Theory		Practical		Total			18 Hours		24 Hours		42 Hours																
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## SYLLABUS

### Theory - I & Practical - II

#### Computer Networking

Practical - II	Theory - I
Identify of Controls and ports of a PC. Connect external devices to a PC. Identify system configuration and connectivity. Using operating system features. Running application packages	Architecture of Digital computer. Architecture of PC. PC family. Specifications of a PC. Connecting PC peripherals. Start-up procedure. Operating system features.
Working with Device manager. Installing, uninstalling and setting I/O devices such as Keyboard, Mouse, Display, Printer, Multimedia, Modem, NIC and others.	Device interface and Drivers. IRQ and DMA. Device interfaces and Drivers. Installing Device drivers and setting. Configuring devices and testing.
Identifying Mother board memories – Replacing/upgrading RAM. Hard disk – Partitioning and formatting. Installing CD drives, DAT drives, ZIP drives, Thumb drives.	Types of Memory devices. Primary Memory types and specifications. Hard Disk and specifications. Partitioning and Formatting of hard disks. Working principle of CD, DAT, ZIP and Thumb drives.
Installing Windows Operating system(s). Installing Linux operating system. Installing Application Packages. Installing additional Utilities.	Operating systems. Features of Operating systems. Loading of Operating systems. Manipulating operating system setup. Applications and Utilities loading and implications on system performance.
Identify Physical Topology of a Network. Identify the members of the network. Identify the protocols installed. Identify and check resource sharing. Identify the cables and components in the network.	Network features. Network Topologies. Network Protocols. Network Models. Network types. Network Components.
Identifying Controls and Ports on servers. Identifying the Hardware of servers. Identifying the configuration of servers. Identifying the NOS and its features. Starting and shutting down servers.	Difference between PC and Server. Usage of Server. Hardware of Server. Types of Servers – functional. Types of servers – commercial. Database management and Data base servers.
Identifying the Configuration. Identifying and using basic features. Using Win 2000 /2003/Linux/UNIX/Novell NOS features	Difference between OS and NOS. Essential features of NOS. Types of NOS.
Networking medias. Media specifications and standards. Types of cables used. Cable preparing procedures and precautions.	Making UTP cross cables and testing. Making straight cables and testing. Making Cable layout drawing. Installing Information outlet points.
Prepare cable terminations. Assemble modular outlets. Install Cross-connect system. Cable identification and cross-connect wire installation. Routing multi-pair cables. Terminating connectors. Preparing optical fiber loose tubes. Cable cleaving.	Cabling evolution. Design process. Structured cabling systems and concepts. Designing work area. Patch panels, Wall mounts and Rack mounts. Testing and Administration. Preparation of Loose tube cable. Preparation of Base and Cover assembly. Installing optical fiber connectors on loose tube cable. Cable cleaving
Install different common protocols one by one	Function of a Protocol and protocol family.

and test communication and features.	NetBEUI UDP/FTP/TFTP TCP/IP TCP/IP Suit
Dynamic Host configuration Protocol. DNS name resolution NetBIOS support /SNMP TCP/IP Utilities Upper Layer services FTP	Install and check TCP/IP utilities and services.
Install and check working of different network protocols.	Alternate Network Protocols Introduction to IPX/SPX AppleTalk Introduction to Apple Open Transport Introduction to IPv6
Identify physical connection of different networking components. Check working of Network components	Used of Different network components. Hubs. Bridges. Switches. Routers. Gateways. Protocols.
Type of power requirement in a Network. Type of power points. Power cabling plan for UPS and Non UPS supplies. Wiring diagram. Calculating power requirement of a network.	Identify power supply of network. Calculate power requirement. Plan segment and switching arrangement. Make wiring diagram. Identify rating and number of Ups required. Plan power point positions and layout
Need analysis. Building wiring plan. Cabling plan. Choosing a Server specification. Choosing Topology. Choosing protocols.	Carryout need analysis and identify model. Decide on topology. Prepare network cabling plan. Prepare layout diagram Choose server hardware and NOS.
Methods, procedure and precautions for Installing windows 2000/2003 server and client software. User accounts. Working with groups. Working with shares. Backup types, media and methods .Data/Disaster Recovery	Install windows 2000/2003 server and configure clients. Add/modify/delete user accounts. Create groups/group memberships. Create shares. Map drives. Set-up network printer. Carryout Daily / weekly Backup and recovery.
Configuring and testing windows server services.	DHCP DNS RAS and RRAS IIS Cluster services Terminal Services
Concept. Types. Components. Access points types (HAP,SAP) Advantages of Wireless networking. Setting up Wireless networks. LAN to LAN Wireless. Roaming Need of Network Security. Methods of securing network.	Installing Wireless LAN cards. Setting up and configuring Access point. Setting up LAN to LAN wireless network. Testing Communication. Setting up network security.
Working with Linux OS	Comparison of Windows and Linux. Linux Operating system. Installing Linux client.
Installing Linux server. Creating users and rights. Resource sharing.	Installing Linux NOS. Configuring. Creating users and shares.
Installing Novell Netware. Configuring. Creating users and shares. Using utilities.	Installing Novell Netware server. Configuring server. Creating users and rights. Resource sharing. Using Novell utilities.
Add SCSI HDD. Add RAM Add DAT, ZIP drives. Install third party utilities. Monitor system performance.	Upgrading RAM. Adding Hard disk Adding Back-up Drives. Installing utilities. Installing applications.
Set up a simulated WAN. Test Features. Check routing features. VISIT to an established WAN setup.	Introduction to WAN. WAN environment and features. WAN Transmission Technologies. WAN connectivity devices. Voice over data service.

### List of Equipments –

Sr. No.	Equipment list for Computer Networking	Qty .
1	Pentium system (Latest conf)	15 No .
2	Client Operating system	Windows for each system.
3	Dot matrix printer	2 No .
4	Inkjet printer	2 No .
5	Laser printer	2 No .
6	Antivirus software	As required
8	Tool kit	5 No.
9	Spare cards and components	Two spare sets
10	Consumable	As required
11	System maintenance software	As required
12	DMM	5 No.
13	Soldering iron	2 No .
14	Desoldering gun	2 No .
15	Temperature controlled soldering/ desoldering station	2 No .
16	Lab table	7 No.
17	Lab stools/chair	20
18	Student locker	4
19	Teacher table	one
20	Teacher chair	one
21	Office Almirah	Two Nos.
22	Book case	one
23	Vacuum cleaner	one
24	Air blower	one
25	Cables connectors etc	As required
26	Servers	3 Nos.
27	Networkingos	Windows/linux/ netware
28	*Switch	4
29	*Router	2
30	Modem	2
31	Rack	2
32	Patch cards	As required
33	Scanner	1Nos.
34	Multimedia kits spare	3 No.
35	Internet connectivity (Cable/ISDN)	1 No.
36	Crimping tools for network cable	2 Nos.
37	Consumable cables, connectors and wall mounts	As required.
38	Multimedia Projector	1 No.
39	UPS 5 KVA	2 Nos.
40	Software * Necessary Training may be given in Industry	As required

## Basic Assembling, Maintenance of PC

Practical - I
Convert Decimal to Binary and reverse. Convert of Binary to octal and reverse. Convert of Binary to Hexadecimal and reverse. Identify given IC's using digital IC handbook. Verify the truth table of NOT, AND, OR, NAND and NOR gates. Construct a logic circuit using basic gates for a given output logic. Construct a 1's compliment & 2's compliment circuit and verify Construct and verify the truth table of flip-flop Construct and test a serial and parallel shift register Construct and test a 4-bit binary counter
Identify the external I/O and memory devices connected to the PC. Identify the controls of each of these devices including the system (CPU) unit. Disconnect the external I/O and memory devices connected to the PC. Re-connect external I/O and memory devices connected to the PC. Practice windows operating system. Practice using notepad. Practice using paint. Identify system specifications.
Use device manager to check status of installed devices. Identify and record IRQ. Make a start-up/emergency diskette. Uninstall, Reinstall and make settings for the following devices using Device manager: Keyboard, Mouse, Display, Multimedia, Printer, Modem, Web camera and other such external devices.
Remove SMPS from cabinet, test SMPS for good working condition and refit to cabinet. Identify the internal parts of a PC. Identify cable connections inside a PC. Identify the specifications of motherboard. Identify the components of a motherboard. Remove, identify and refit add-in cards Remove, identify and refit RAM, Processor. Practice CMOS setting. Remove and refit FDD. Remove and refit HDD. Remove and refit CD ROM drive. Partition HDD, Format HDD, Load operasystem. Load multiple Operating system (Windows & Linux). Test working. Assemble PC given all components. Check for working. Identify defect (Hardware/software). Rectify defect. Identify possibility of upgrading a given PC to given specification. Collect and up grade PC. Check working of upgraded PC.
Load maintenance utilities to check system performance. Test and report system performance

**List of Tools, Machinery, Equipments Etc.**

<b>Sr. No.</b>	<b>Name Of Item</b>	<b>Quantity (Nos.)</b>
<b>Hardware</b>		
1	Intel Pentium IV @ 2.0 GHz or higher, 512 MB RAM, Intel Motherboard, 40 GB Hard Disk, 17" Monitor, Keyboard, Mouse, 52X CD ROM Drive, 1.44 MB FDD, Multimedia kit, Network Interface Card or latest configuration	17 (9 nos. connected in LAN, 8 for Assy & Maint. Practice)
2	ISDN/Broad Band Internet Connection	01
3	20 MHz Dual Trace Oscilloscope	02
4	Digital trainer kit	08
5	Logic Probes/Logic Pulser	08
6	Digital IC tester	04
7	Function Generator	04
8	Pulse Generator	04
9	Digital ICs	As required
10	DC regulated power supply (5 volts and 12 volts )	08
11	Digital Multimeter	17
12	Analog Multimeter	08
13	Digital LCR Meter	03
14	Bread Boards for circuit wiring and testing	20
15	Meggar 500V	02
16	Ammeter (0-10 mA), (0-50mA), (0-100mA) (table model)	02 each
17	Voltmeter (0-1V), (0-10V), (0-30V) (table model)	02 each
18	Different types and makes of Motherboards	10
19	CD Writers	04
20	DVD writer	04
21	External HDD	17
22	Floppy Disk Drive	17
23	CD ROM Drive	08
24	Display card	08
25	Ethernet card	08
26	Computer monitor 15"/17" of different types	04
27	Cabinet with SMPS	08
28	Keyboard and mouse	08 each
29	Thumb drive (latest specification)	08
30	Internal PCI modems of at least four different makes and types	01 each
31	External modems of at least two different makes and types	01 each
32	COMBO drives at least four different makes and types	01 each
33	Dot matrix printer	02

34	Inkjet printer	02
35	Laser printer (B&W)	02
36	Scanner	01
37	UPS 500 VA	17
38	Soldering iron	17
39	De-soldering pump/gun	17
40	Temperature controlled soldering/ desoldering station	04
41	Computer Tool kit for students	17
42	Screw Driver Set - Star/Flat of different sizes	04 each
43	Long Nose Plier	08
44	Combination Plier	04
45	Tweezer	17
46	Wire Stripper	08
47	IC Puller	17
48	Vacuum Cleaner	01
49	Hand blower	01
50	Hand Brush	As required
51	Silicon grease	do
52	Heat sink agent	do
53	RAM 512 MB	do
54	CPU different types	Do
<b>Software</b>		
55	Microsoft Window 2000/ XP	As required
56	MS Office	As required
57	Anti virus latest version	As required

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