

Syllabus for Certificate Program in Hardware and Networking

UNIT – I

Introduction to Computers– Types of Computers - Micro, Mini, Mainframe and Super Computer, Architecture of a Computer System–Processor (CPU) - Types and their specifications (Intel: Celeron, P4 family, Xeon, dual core, quad core, core 2 duo, i3,i5,i7 and AMD), ALU, Memory - Types, Storage, Semiconductor memories: RAM, ROM, PROM, EMPROM, EEPROM, Static and Dynamic, Cache Memory,Secondary Storage Devices -Types, Capacity, Popular Brands, Standards, Interface, Concept of Tracks, Sector, Cylinder and Cluster.Jumper setting, CMOS setting, Input/Output Devices

Serial Port and Parallel Port–Principle of Communication, Types of ConnectingDevices, Interface Standards, Connectors.

Concept of Operating System–Types of Operating Systems, Functions of an Operating System, Need of OS, Batch Processing, Multi-processing, Single user & Multi user OS, Distributed and Time Sharing Operating Systems, Introduction to Unix, Linux, Windows, Windows NT systems.

UNIT – II

Introduction to Computer Networks – Definition, Advantages, Architecture: Peer-to-Peer and Client/Server Network. Network Topologies – Star, Ring, Bus, Tree, Mesh, Hybrid.Types of Network – Local Area Network (LAN), Metropolitan Area Network (MAN), Wide Area Network (WAN), Intranet and Internet.Wi-Fi, Bluetooth.

Communication Media & Connectors – Introduction to Data Communication – Analog and Digital Signals. Transmission mode: Simplex, Half-Duplex and Full-Duplex.Unshielded twisted-pair (UTP), shielded twisted-pair (STP), Fiber Optics and coaxial cable: RJ-45, RJ-11, BNC. Understanding color codes of CAT5 cable. 568A and 568B convention.

Network Components – Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches– their functions, advantages and applications.

Protocols–OSI,TCP/IP.Simple Mail Transfer Protocol (SMTP), Telnet, File Transfer Protocol (FTP), Hyper Text Transfer Protocol (HTTP). Setting IP Address(IP4/IP6) & Subnet Mask, Classes of IP Addressing. Introduction to Network Security, Concept of Dynamic Host Control Protocol.

Reference Books

1. PC Hardware: The Complete Reference by Craig Zacker and John Rourke
2. PC Hardware: A Beginner's Guideby Ron Gilster
3. Computer Fundamentals - by P.K.Sinha
4. Networking The Complete Reference, Third Edition by Bobbi Sandberg
5. Basics of Computer Networking by Thomas Robertazzi

Practical Lab.

Hardware—Introduction to Computer System. Identify the front and rear panel controls and ports on a PC. Power Supply Connections. Motherboard Connections. Motherboard Components. CPU (Processor), RAM (Memory), Hard Drive Connections, ROM Drives, Video Cards, Sound Cards.

Installation of a PC—Removing and Installing - Power Supply, the Processor, the Motherboard, RAM, ROM, Hard Drive, Fans, Video Card, Expansion Cards, a CPU Cooler, CMOS Battery. Troubleshooting, About SMPS and its cable, Connector and Servicing Procedure.

Windows Installation—Windows - Concept of GUI, Desktop, Icons - My Computer, Network Neighborhood, Network Places, Recycle bin, Briefcase. Display, Drag and Drop, Task Bar, Start Menu, Tool Bar, and Menus. Windows Explorer. Properties of files and folders. Executing application programs. Properties of connected devices. Applications under windows accessories. Windows Help, Search feature, Control panel, Installation of devices.

A walkthrough of installing Windows XP, Windows 7 / 8, Imaging: create a Windows system image. How to Backup/Restore your Windows partition with the bootable image disk, Setting a multiboot system, the Windows bootmanager vs. an alternative bootmanager, Setting up a dualboot system, Dual Boot Linux and Windows. Windows XP registry tweaks.

Components of Computer Network—Layout of Network, Familiarization with various Network devices, Connectors and Cables.

Crimping & Punching—Crimping practice with straight and cross CAT 5 cables. Punching practice in IO Box and patch panel. Crimping and making cables.

Cabling—Create cabling in a lab with HUB/Switch and IO Boxes and patch panel. Fitting of Switch Rack.

Install & configure a Network— Installing & Configuring a Peer-to-Peer Network using Windows Software.

Configuration of Data Communication Equipment—Connecting computers with Network with Drop cable and using Wi Fi configuration. Basic Programmable switch Configuration, IP Routing Process, Verifying Configuration.

IP Addressing & TCP/IP— IP Addressing Technique (IP4/IP6) and Subnetting and Supernetting the network. Installation and Configuration of TCP/IP Protocol. Practice TCP/IP Utilities: PING, IPCONFIG, HOSTNAME, ROUTE.

Other Network Protocols: Working with SMTP, TELNET, FTP, HTTP, Configuring DHCP.