COMPUTER HARDWARE AND NETWORKING

LEVEL - 1

DURATION: 80 HOURS

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OBJECTIVE:

This course is to ensure a dazzling career in the hardware and networking sector. The course gives emphasis on practical knowledge and gives the student a detailed overview on the Computer basics, Internet, Hardware and Networking concepts. A certification is needed for almost all beginning computer engineering jobs. Getting into engineering career requires a strong background in computers and networking. A Computer hardware/network Engineers should be creative, curious, and be able to analyse and pay attention to detail. They should be able to work as part of a team, so people skills are important.

Software Requirements

Windows server 2012, Windows 7/8 versions, Red hat/Ubuntu/Debian/GNU Linux
MS-OFFICE 2007/2010/2013/2016
Diagnostic tools
Installation CDs
Exam dumps

Hardware Requirements

Computer system –Minimum 3 no's (1 Server and 2 clients)

For each lab station, you will need the following hardware. It is recommended that the documentation and driver disks for each device be included for use by students as needed. For some of the more expensive items, or less common devices, you might perform an instructor demonstration, have one lab station install the item and others watch, or pass the device from one lab station to the next with each station installing then removing the device.

- An ATX-based system with PCI and ISA slots. Whenever possible, have enough components for each lab station to install each device. If the systems you are using have only PCI slots, have at least one other system that contains both ISA and PCI slots. The computer also needs at least one of each of the following ports parallel, VGA, keyboard and mouse PS/2 ports, serial, USB, FireWire, and sound including Line In, Line Out, Mic, and Game ports.

- PCI Cards.
- ISA Cards.
- Printer with a Parallel port.
- Printer with a Serial port.
- Printer with an Infrared port.
- Printer with a USB port.
- Internal and external modems.
- USB hub.
- USB devices.
- Network cards (and any required networking equipment for students to reach the Internet).

- PDA with serial, USB, and/or Infrared ports.
- Extra RAM to install.
- Additional IDE Hard Drive, CD-ROM, CD-RW, DVD, or DVD-R Drive to install.
- Additional SCSI Hard Drive or CD/DVD drives to install.
- External SCSI device.
- Additional Parallel port devices.
- FireWire port.
- FireWire devices.
- FireWire hub.
- Speakers.
- Microphone.
- Joystick or other game controller that connects to the 15-pin game port.
- MIDI device.
- Other quarter-inch mini-jack device (cassette player, musical keyboard, and so on).
- Digital camera.
- Laptop with docking station and/or port replicator.
- External SCSI devices.
- PC Cards (Type I, II, and III if possible).
- UPS.
- ESD protection devices such as workbench mats with wrist strap and grounding cord, floor mat with grounding cord and shoe straps.
- PC cleaning supplies such as compressed air canisters, mini-vacuum suitable for laser printers, swabs, alcohol, monitor wipes, and other PC cleaning solutions.
- Audio CD.
- AGP video card.
- RAID controller and drives.
- Wireless devices including mouse and/or keyboard and networking devices.
- Cartridge drive and cables (Iomega Zip or Jaz, Super Disk, or similar drives).
- At least one system with dual processors.
- Cables for all devices. In addition, you also need the following cables Null modem, RJ-45, RJ-11, RG 6, RG 8, RG 58, RG 59, STP, and Fiber Optic.

Some topics describe hardware that you are less likely to have. However, if you do have access to the hardware, it will enhance the learning experience for the students. Any of the following items will be of benefit to students in installing, configuring, working with, and troubleshooting.

- Digital flat panel monitor with DVI connection.
- DVI port.
- CPU cooling systems including temperature sensors, liquid cooling systems, thermal compounds, heat sinks, and fans.
- Riser cards for audio and communications (also known as daughter boards).
- Mini PCI adapters for notebook computers.
- Different kinds of memory packages.
- Different kinds of CPU packages.
- Touch screen monitor or panel to attach to a monitor.

- External tape drive.
- CAD/CAM devices.
- Cable modem.
- DSL modem.
- Special function video card such as those with TV tuner or TV connection capabilities.
- Various types of RAM.
- Solid Ink printer.
- Thermal printer.
- Dye sublimation printer.
- Printers with features such as the ability to add memory, hard drives, NICs, operational trays and feeders, finishers such as staplers, and/or functions such as scanning, fax, and copier built into the printer.
- Battery operated printer.

For the troubleshooting s, if you have access to any non-working devices, the devices can be installed for students to troubleshoot.

- Any of the devices students have worked with (from the hardware list for the course) that are not working are suitable for this purpose.
- Some suggestions for simulating problems are included as Instructor Notes in the Activities, but actual non-working devices can often be beneficial in helping students identify when something is broken as opposed to not correctly configured.
- Damaged CD-ROM.
- Broken or damaged cables.

Networking Devices

- Hub, Repeater, Bridge, Switch, Router, Bridge Router and Gateway

Cabling and Network Interface Card

- Cabling -UTP, STP, Coaxial, Fiber-optic, Wireless Network Interface Card

Cable testers, Protocol,TDR (Time-domain Reflectometer), OTDR (Optical Time-domain Reflectometer), Multimeter, Toner probe, Butt set, Punch down tool, Cable stripper, Snips, Voltage event recorder, Temperature monitor

Windows Server Tools
Computer systems (client\server setup)

Faculty Skill Set:

Must be A+, N+, MCITP OR MCSE Server certified

Thorough Knowledge in computer peripherals, electronic components.

Knowledge in open source concepts and Linux operation systems.

COURSE CONTENT

COMPUTER HARDWARE 40 HRS.

LESSON 1: HARDWARE FUNDAMENTALS

- Personal Computer Components
- Storage Devices
- Mobile Digital Devices
- Connection Interfaces

LESSON 2: MANAGING SYSTEM COMPONENTS

- Identify Motherboard Components and Features
- Install and Configure CPUs and Cooling Systems
- Troubleshoot System Components

LESSON 3: MANAGING DATA STORAGE

- Identify RAM Types and Features
- Troubleshoot RAM Issues
- Install and Configure Storage Devices
- Troubleshoot Hard Drives and RAID Arrays

LESSON 4: SUPPORTING DISPLAY DEVICES LECTURE

- Install Display Devices
- Configure Display Devices
- Troubleshoot Video and Display Devices

LESSON 5: INSTALLING AND CONFIGURING PERIPHERAL COMPONENTS LECTURE

- Install and Configure Input Devices
- Install and Configure Output Devices
- Install and Configure Input/output Devices
- Install and Configure Expansion Cards

LESSON 7: SUPPORTING PRINTERS AND MULTIFUNCTION DEVICES LECTURE

- Printer and Multifunction Technologies
- Install and Configure Printers
- Maintain Printers
- Troubleshoot Printers

LESSON 8: INSTALLING MICROSOFT WINDOWS LECTURE

- Install Microsoft Windows
- Upgrade Microsoft Windows

NETWORKING 40 HRS.

LESSON 1: NETWORK THEORY

- Networking Terminology
- Network Categories
- Standard Network Models
- Physical Network Topologies
- Logical Network Topologies

LESSON 2: NETWORK COMMUNICATION METHODS

- Data Transmission Methods
- Media Access Methods
- Signalling Methods

LESSON 3: NETWORK MEDIA AND HARDWARE

- Bounded Network Media
- Unbounded Network Media
- Noise Control
- Network Connectivity Devices

LESSON 4: NETWORK IMPLEMENTATIONS

- Ethernet Networks
- Wireless Networks

LESSON 5: NETWORKING MODELS

- The OSI Model
- The TCP/IP Model

LESSON 6: TCP/IP ADDRESSING AND DATA DELIVERY

- The TCP/IP Protocol Suite
- IP Addresing
- Default IP Addressing Schemes
- Create Custom IP Addressing Schemes
- Implement IPv6 Addresses
- Delivery Techniques

LESSON 7: TCP/IP SERVICES

- Assign IP Addresses
- Domain Naming Services
- TCP/IP Commands
- Common TCP/IP Protocols
- TCP/IP Interoperability Services