

**Essential Curriculum  
Computer Networking 1**

**PC Systems Fundamentals**

35 hours teaching time

**Part 1**----- 2.3 hours

- Develop an awareness of laboratory safety issues.
- Identify sources of electrical hazards and how to mitigate them.
- Identify sources of mechanical hazards and how to mitigate them.
- Describe the effects of varying levels of voltage and current on the human body.
- Define Electro Static Discharge (ESD) and its effects on the human body and on electronic components

**Part 2**----- 2.3 hours

- Identify a multi-meter and gain experience in its use.
- Identify parameters of a circuit.
- Measure voltage of a voltage source.
- Measure resistance of a resistor.
- Measure resistance of a simple circuit
- Measure current in a simple circuit

**Part 3**----- 16.3 hours

- Assemble a PC from its individual major component parts.
- Identify the major units in the PC, their placement/location, and their function.
- Identify the components of a motherboard, their placement/location, and their function
- Describe the operation of the power supply
- Disassemble the PC into its individual major parts.
- Describe the Boot process and its purpose.

**Part 4**----- 2.3 hours

- Identify typical peripheral devices associated with the PC and their function
- Identify the names, purposes, and characteristics of ports and cables.
- Identify the names, purposes, and characteristics of input devices.
- Identify the names, purposes, and characteristics of output devices.

Part 5----- 5.8 hours

Explain the purpose of an operating system.

Describe and compare operating systems to include purpose, limitations, and compatibilities.

Identify the process steps for installing an operating system.

Part 6----- 2.3 hours

Define the binary number system and its use.

Compare the binary number system with the decimal number system.

Translate between the binary number system and the decimal number system and vice-versa.

Define the hexa-decimal number system and its use.

Translate between the hexa-decimal number system, binary number system, and the decimal number system and vice-versa.

Part 7----- 3.5 hours

Define the Internet and its uses.

Define a browser and its uses.

Define a search engine and its uses.

Define a URL and describe its use.

Identify the parts of a URL.

## **Essential Curriculum Computer Networking 1**

### **Cisco Discovery 1: Networking for Home and Small Businesses**

81.5 hours teaching time

#### Chapter 1 Personal Computer Hardware----- 7 hours

Identify where personal computers are found and what use they serve.

Describe the difference between a local application and a network application.

Identify some types of computing devices and their main applications.

Describe how data is represented and manipulated in a computer system.

Describe the role of the various computer components and peripherals.

Identify the proper way to install and test computer components and peripherals.

#### Chapter 2: Operating Systems----- 7 hours

Define the purpose of an OS.

Identify the IP parameters that must be configured to prepare a computer to participate on the network.

Describe how operating systems are maintained.

Describe the role of the shell and kernel.

Describe the difference between a CLI and GUI interface.

Define a network redirector.

Identify some of the common operating systems available.

Describe the difference between commercial and GPL software licensing.

Identify the different options for OS installation.

Describe an OS upgrade and how is it performed.

Define a file system and the types that are used with PCs.

Chapter 3: Connecting to the Network----- 12.8 hours

- Define the term network.
- List some of the more common networks we use in everyday life.
- Define communication protocols.
- Describe how communication occurs across a local Ethernet network.
- List the main high-level components of an information network.
- Identify when a computer plays the role of a client, server, or both on a network.
- Describe how to build a computer peer-to-peer network and verify it is functioning.
- Describe how networks are graphically represented.
- Identify the difference between logical and physical network topologies.
- Identify the purpose of the access and distribution layers and the devices each normally contain.
- Describe how hubs, switches, and routers function.
- Describe a broadcast domain and a collision domain and why they are important.
- Define ARP and how it functions.
- Describe the importance of a default gateway.
- Define prototyping.

Chapter 4: Connecting to the Internet Through an ISP----- 10.5 hours

- Define the Internet.
- Describe an Internet service provider (ISP) and the services that they provide.
- Identify the options for connecting to the Internet using an ISP.
- Describe how the Internet Protocol (IP) is used in sending messages across the Internet.
- Describe how information is sent across the Internet through an ISP.
- List the primary components of an ISP Network Operations Center (NOC).
- Compare the environmental requirements of a home/small business network with those of an ISP NOC.
- Identify the different types of cables and connectors used for connecting the devices in a NOC.
- Identify the two main Ethernet unshielded twisted-pair (UTP) cable wiring standards.
- Identify the difference between a straight-through and crossover cable and their usage.
- Describe how UTP cables are constructed and terminated to provide a reliable connection.
- Describe UTP cabling best practices

Chapter 5: Network Addressing----- 9.3 hours

Identify the purpose of an IP address and subnet mask and how they are used on the Internet.

Describe the difference between a unicast, multicast, and broadcast IP address.

List the three classes of assignable IP addresses and their ranges.

Describe how IP addresses are obtained.

Describe the difference between a public and a private IP address and when each is used.

Identify RFC 1918 address space.

Describe how does NAT functions.

Chapter 6: Network Services----- 8.1 hours

Describe the roles of a client and server and how they interact over the network.

List some common network services available that operate in a client/server relationship.

Compare TCP and UDP transport protocols.

Identify the function of a port.

List some well-known port numbers and the protocols/applications that use them.

Define Domain Name System (DNS) and its purpose.

Describe the interaction of various types of Internet applications, such as e-mail, WWW, FTP, IM, and voice.

Describe the interaction of a protocol stack on a host when sending and receiving a message.

Identify the purpose of a layered networking model.

Define the Open Systems Interconnect (OSI) layered network model.

Chapter 7: Wireless Technologies----- 9.3 hours

Identify the benefits and limitations of wireless technology.

Identify where wireless technologies are commonly used.

Compare a wireless personal-area network (WPAN), a WLAN and a WWAN.

Identify the components required to build a WLAN and their functions.

Describe the current standards for WLANs.

Identify the parameters that must be configured to allow a wireless client to access network resources.

Identify the techniques available to help secure the WLAN.

Describe how an access point and wireless client are configured to allow communication to occur.

Chapter 8: Basic Security----- 8.2 hours

Describe the main networking threats and their characteristics.

Identify the different methods of attack.

Identify the security procedures and applications that exist to help prevent attacks.

Define a firewall and how it is used to protect against an attack.

Define a DMZ and how basic DMZ architecture is structured.

Describe how to configure a DMZ and port forwarding with an integrated router device.

Define vulnerability analysis software and how it can help prevent attacks.

Chapter 9: Troubleshooting Your Network----- 9.3 hours

List the steps involved in the troubleshooting process.

Identify some of the common troubleshooting techniques and when it is appropriate to use each.

Describe how the senses can be used to troubleshoot network issues.

Identify the utilities that are available for troubleshooting connectivity issues.

Identify some of the more common issues with wired networks.

Identify some of the common issues related to WLANs.

List some possible sources of help when troubleshooting.

**Essential Curriculum  
Computer Networking 1**

**Cisco Discovery 2: Working at a Small to Medium Business or ISP**

91 hours teaching time

Chapter 1 The Internet and its Uses----- 8.1 hours

- Identify ways the Internet is evolving.
- Identify ways businesses and individuals use the Internet.
- Understand the importance of standards in the continuing growth of the Internet.
- Identify the role of an Internet service provider (ISP).
- Describe how the hierarchical structure of the Internet allows the efficient movement of information.
- Define a point of presence (POP) and an Internet Exchange Point (IXP).
- Identify types of devices that ISPs use to provide services.
- Understand scalability and why it is important in the ISP network.
- Identify the different support teams that work at an ISP and their purpose.

Chapter 2: Help Desk----- 7 hours

- Describe the various roles of help desk and installation technicians.
- Identify levels of support do help desk technicians provide?
- Identify the seven layers of the OSI model.
- Describe how is the OSI model is used to troubleshoot network issues.
- Identify the common tools and diagnostic procedures that help desk technicians use.
- Identify the onsite procedures that are used to help resolve issues.

Chapter 3: Planning a Network Upgrade----- 9.3 hours

- Describe why proper planning is necessary when performing a network upgrade.
- Define a site survey, and why it is necessary.
- Identify the steps involved in performing a site survey.
- Define structured cabling.
- Identify factors that must be considered when upgrading LAN and internetworking devices.

Chapter 4: Planning the Addressing Structure----- 10.5 hours

- Describe how IP addressing is implemented in the LAN.
- Define classful and classless networks and subnets.
- Describe how a given network can be subnetted to allow for efficient use of IP addresses.
- Describe how Network Address Translation (NAT) and Port Address Translation (PAT) are used in a

network.

Chapter 5: Configuring Network Devices----- 15.1 hours

Define an ISR.

Identify the methods available for configuring an ISR.

Describe how in-band configuration differs from out-of-band configuration.

Identify when is it appropriate to use SDM or SDM Express to configure a Cisco device.

Identify the difference between the startup configuration and the running configuration.

List the commands required to perform basic configuration on a Cisco 1841 ISR.

Identify the commands required to configure an ISR to function as a DHCP server.

List the commands necessary to configure static NAT on an ISR.

Identify the commands required to perform basic configuration on a Cisco 2960 switch.

Describe switch port security, and how it is configured.

Define CDP, and describe how it functions.

Identify the types of WAN connections available, and how they compare in terms of cost and speed.

Chapter 6: Routing----- 11.7 hours

Describe the purpose and function of dynamic routing.

List the characteristics of directly connected static and dynamic routes.

Identify the main interior gateway protocols and their key features.

Describe how RIPv2 dynamic routing is configured using the Cisco IOS.

Define exterior gateway routing protocols, and how they are used across the Internet.

Identify what is required to enable BGP on a customer site router.

Chapter 7: ISP Services----- 9.3 hours

Identify the types of network services an ISP provides.

Identify the protocols that support the services offered by an ISP, and describe how do they work.

Describe how UDP differs from TCP.

Identify the types of traffic that uses UDP, and the types that use TCP.

List some of the more common application layer protocols, and their purpose.

Describe the purpose of the Domain Name System (DNS), and how it functions.

Describe how common protocols such as HTTP, HTTPS, FTP, SMTP, IMAP, and POP3 function.



Chapter 8: ISP Responsibility----- 9.3 hours

Identify security policies and procedures employed by ISPs.

Identify the tools used to implement security at the ISP.

Describe how the ISP is monitored and managed.

Describe the ISP's responsibilities for maintenance and recovery.

Chapter 9: Troubleshooting----- 10.5 hours

Describe how the OSI model is used as a framework for troubleshooting network problems.

Describe how problems with hardware and the operation of Layer 1 and Layer 2 are identified and corrected.

Define the procedure for troubleshooting IP addressing problems, including subnet mask, host range errors, DHCP and NAT issues.

Describe how to identify and correct problems with RIPv2 configuration and implementation.

Identify some possible causes of problems occurring with user applications.

Describe how symptoms of DNS failure can be recognized.

Identify what must be done to create a plan to prepare to take the ICND1 examination in order to obtain a CCENT certification.