Western Technical College

10150120 Cisco 2: Routing Technologies

Course Outcome Summary

Course Information

Description	The emphasis in this course is on routing theory and router technologies. The student will examine router elements, identify the functions of the TCP/IP transport-layer protocols, configure IP addresses, monitor and verify selected access list operations, and more. The course is delivered using a combination of lectures, lab projects, and the Internet. PLEASE NOTE: A Windows operating system is recommended for this course. Required software used in this course is not compatible with Mac operating system.
Career Cluster	Information Technology
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	90

Pre/Corequisites

Prerequisite 10150110 Cisco 1: Networking Fundamentals

Textbooks

No textbook required.

Program Outcomes

1. Identify security strategies
2. Implement secure infrastructures
3. Conduct security testing

4. Analyze security data
5. Mitigate risk
6. Develop security documentation

Course Competencies

1. Investigate the use of the internet and the development of Internet Service Providers (ISP).

Assessment Strategies

1.1. Written Objective Test

Criteria

You will know you are successful when

1.1. you explain the three tiers that ISP can connect to the internet.
1.2. you differentiate between, DSL, cable and satellite ISP service.
1.3. you explain the need for redundancy, salability and reliability for internet service.
1.4. you explain the various support functions of an ISP.
1.5. you explain the bandwidth and usage of T1, T3 and OC-3 connections.
1.6. you run the utilities ping and tracert mapping internet locations.

Learning Objectives

1.a. Explore the hierarchical structure of the Internet.
1.b. Identify the services offered by an ISP.
1.c. Determine the various connects to the internet.
1.d. Identify the need for reliable and scalable ISP services.

2. Connect the levels of support at a "helpdesk" with the Open Systems Interconnection (OSI) model.

Assessment Strategies

2.1. Written Objective Test

Criteria

You will know you are successful when

2.1. you define of the function of Level 1, Level 2 and Level 3 support.
2.2. you demonstrate data flow into segments, packets, frames and bits.
2.3. you explain the functions of a trouble ticket in a help desk.
2.4. you relate varies problems to the corresponding layer of the OSI model.
2.5. you describe the purpose of service level agreement (SLA).

Learning Objectives

2.a. Explore the functions of a help desk.
2.b. Identify the levels of support of a help desk.
2.c. Interpret the encapsulation process.
2.d. Identify problems based on the layers of the OSI model.

3. Plan a network addressing scheme and implement an IP addressing scheme.

Assessment Strategies

3.1. Lab Assignment
3.2. Skill Demonstration
3.3. Written Objective Test

Criteria

You will know you are successful when

3.1. you give examples of valid host addresses for a given subnet.
3.2. you determine subnet mask needed to meet specified requirements for hosts and networks.
3.3. you identify the parts of an IPv6 IP address.
3.4. you create a VLSM addressing scheme.

3.5. you complete binary to decimal conversions.
3.6. you identify broadcast addresses within subnets.
3.7. you apply NAT and PAT schemes to a router configuration.

Learning Objectives

3.a. Explore IP addressing and subnetting.
3.b. Explore IP addressing configuration with CIDR.
3.c. Assign subnetting ranges to segments.
3.d. Identify public and private IP addressing.
3.e. Recognize the need and functions of IPv6.
3.f. Identify the purpose of NAT and PAT.

4. Examine router and switch components.

Assessment Strategies

4.1. Lab Assignment
4.2. Skills Test
4.3. Written Objective Test

Criteria

You will know you are successful when

4.1. you identify console, serial, and Ethernet ports on a router.
4.2. you connect to a router using hyperterminal.
4.3. you explain the function of RAM/DRAM, NVRAM, FLASH and ROM.
4.4. you observe the startup sequence of a router and switch.
4.5. you make a recommendation in selecting a router based on research.
4.6. you make a recommendation in selecting a switch based on research.
4.7. you plan proper cabling for horizontal, vertical and backbone cabling of network devices.

Learning Objectives

4.a. Identify external components of a router.
4.b. Identify internal components of a router.
4.c. Identify configuration methods to program a router.
4.d. Document devices on a network.

5. Configure network routers and switches.

Assessment Strategies

5.1. Lab Assignment
5.2. Skills Test

Criteria

You will know you are successful when

5.1. you assign an IP address and subnet mask to an interface.
5.2. you set up password security to console and VTY.
5.3. you set up router table with networks and default routes.
5.4. you explain the purpose of global configuration.
5.5. you use the user mode prompt and privileged mode prompt.
5.6. you demonstrate the use of help functions when entering commands.
5.7. you copy running configuration to startup configuration.
5.8. you erase the startup configuration.
5.9. you back up the startup configuration using hyperterminal and TFTP.
5.10. you restore a configuration file using hyperterminal and TFTP.
5.11. you complete a password recovery.
5.12. you use SDM Express to configure a router.
5.13. you use Packet Tracer to simulate lab assignments.

Learning Objectives

5.a. Configure a router using CLI starting with an erased startup configuration.
5.b. Examine user and privileged modes.
5.c. Discuss the difference between startup and running configuration.
5.d. Configure a router using SDM (Security device Manager).

6. Research router IOS support options.

Assessment Strategies

6.1. Written Objective Test

Criteria

You will know you are successful when

6.1. you list the three parts included in the Cisco IOS naming convention.
6.2. you demonstrate how to use a TFTP server to save and restore a Cisco IOS.
6.3. you demonstrate the use of the show version command to obtain information about the IOS version.
6.4. you demonstrate how to change the default configuration register to enter ROM monitor mode.
6.5. you back up an IOS.
6.6. you explain the IOS search sequence.

Learning Objectives

6.a. Illustrate the process the router uses to locate an IOS.
6.b. Explore Cisco IOS naming conventions.
6.c. Discuss the process for creating and loading an IOS backup image.
6.d. Identify commands to display information about Cisco IOS.

7. Build network routing tables.

Assessment Strategies

7.1. Lab Assignment
7.2. Skills Test
7.3. Written Objective Test

Criteria

You will know you are successful when

7.1. you create RIP routing table.
7.2. you explain why RIP Version 2 was created.
7.3. you initiate RIPV2.
7.4. you explain the use of autonomous system numbers.
7.5. you explain the need for BGP.

Learning Objectives

7.a. Implement router RIP protocol.
7.b. Create a network diagram using routing tables.
7.c. Explore the use of BGP (Border gateway Protocol) in a network design.

8. Identify security policies and procedures at an ISP.

Assessment Strategies

8.1. Written Objective Test

Criteria

You will know you are successful when

8.1. you create an ACL to filter traffic.
8.2. you recommend an anti-virus software product based on research.
8.3. you capture packets using a network monitoring tool, like Wireshark.
8.4. you use telnet to manage remote devices.
8.5. you develop a backup strategy using full, incremental and differential services.

Learning Objectives

8.a. Discuss the use of ACL for security.
8.b. Recognize the need for anti-virus software.
8.c. Develop a backup strategy.

9. Correct network problems using the OSI model.

Assessment Strategies

9.1. Lab Assignment

9.2. Skills Test
9.3. Written Objective Test

Criteria

You will know you are successful when

9.1. you demonstrate the use of ping, traceroute, and telnet to isolate connectivity problems.
9.2. you configure and troubleshoot problems a basic network configuration.
9.3. you apply router show commands to identify configuration problems.
9.4. you list common errors that occur at Layers 1, 2, and 3 of the OSI model.
9.5. you apply debug commands to monitor network traffic.

Learning Objectives

9.a. Use telnet, ping, tracert to test connectivity.
9.b. Use router "show" commands to identify problems.
9.c. Explore trouble shooting models to solve network problems.
9.d. Use debug commands to check real-time traffic