

Virginia Western Community College
TEL 250
Internetworking III

Prerequisites

TEL 151

Course Description

Studies the advantages of LAN segmentation using bridges, routers, and switches, Fast Ethernet configuring access lists. Covers Spanning Tree Protocol and Virtual LANs

Semester Credits: 4 Lecture Hours: 3 Lab/Clinical/Internship Hours: 3

Required Materials**Textbook:**

All reading material is located on netacad.com

Other Required Materials:

Packet Tracer Software (available from the class website)

Course Outcomes

At the completion of this course, the student should be able to:

- Configure and troubleshoot DHCP and DNS operations for IPv4 and IPv6
- Describe the operations and benefits of the Spanning Tree Protocol (STP)
- Configure and troubleshoot STP operations
- Describe the operations and benefits of link aggregation and Cisco VLAN Trunk Protocol (VTP)
- Configure and troubleshoot VTP, STP, and RSTP
- Configure and troubleshoot basic operations of routers in a complex routed network for IPv4 and IPv6
- Configure and troubleshoot advanced operations of routers and implement RIP, OSPF, and EIGRP routing protocols for IPv4 and IPv6
- Manage Cisco IOS® Software licensing and configuration files

Topical Description

- Lesson 01: Introduction to Scaling Networks
 - Describe the use of the hierarchical network for a small business.
 - Describe recommendations for designing a network that is scalable.

- Select the appropriate switch hardware features to support network requirements in small - to medium-sized business networks.
- Describe the types of routers available for small - to medium-sized business networks.
- Configure basic settings on a Cisco IOS device.
- Lesson 02: LAN Redundancy
 - Describe the issues with implementing a redundant network.
 - Describe IEEE 802.D STP operation.
 - Describe the different spanning tree varieties.
 - Describe PVST+ operation in a switched LAN environment.
 - Describe Rapid PVST+ operation in a switched LAN environment.
 - Configure PVST+ in a switched LAN environment.
 - Configure Rapid PVST+ in a switched LAN environment.
 - Identify common STP configuration issues.
 - Describe the different varieties of the First Hop Redundancy Protocols.
 - Use Cisco IOS commands to verify HSRP and GLBP implementations.
- Lesson 03: Link Aggregation
 - Describe link aggregation.
 - Describe EtherChannel technology.
 - Configure link aggregation with EtherChannel.
 - Troubleshoot link aggregation with EtherChannel.
- Lesson 04: Wireless LANs
 - Describe wireless LAN technology and standards.
 - Describe the components of a wireless LAN infrastructure.
 - Describe wireless topologies.
 - Describe the 802.11 frame structure.
 - Describe the media access method used by wireless technology.
 - Describe channel management in a WLAN.
 - Describe threats to wireless LANs.
 - Describe wireless LAN security mechanisms.
 - Configure a wireless router to support a remote site.
 - Configure wireless clients to connect to a wireless router.
 - Troubleshoot common wireless configuration issues.
- Lesson 05: Adjust and Troubleshoot Single-Area OSPF
 - Modify the OSPF interface priority to influence the DR/BDR election.
 - Configure a router to propagate a default route in an OSPF network.
 - Modify OSPF interface settings to improve network performance.
 - Configure OSPF authentication to ensure secure routing updates.
 - Explain the process and tools used to troubleshoot a single-area OSPF network.
 - Troubleshoot missing route entries in a single-area OSPFv2 route table.
 - Troubleshoot missing route entries in a single-area OSPFv3 route table.
- Lesson 06: Multiarea OSPF
 - Explain why multiarea OSPF is used.
 - Explain how multiarea OSPF used link-state advertisements in order to maintain routing tables.
 - Explain how OSPF establishes neighbor adjacencies in multiarea OSPF implementation.
 - Configure multiarea OSPF in a routed network.
 - Configure multiarea router summarization in a routed network.

- Verify multiarea OSPF operations.
- Lesson 07: EIGRP
 - Describe the basic features of EIGRP.
 - Describe the types of packets used to establish and maintain an EIGRP neighbor adjacency.
 - Describe the encapsulation of EIGRP messages.
 - Configure EIGRP for IPv4 in a small routed network.
 - Verify an EIGRP for IPv4 implementation in a small routed network.
 - Explain how neighbor adjacencies are formed using EIGRP.
 - Explain the purpose of the metrics used by EIGRP.
 - Explain the operation of DUAL and the use of the topology table.
 - Describe events that trigger EIGRP updates.
 - Compare characteristics and operation of EIGRP for IPv4 to EIGRP for IPv6.
 - Configure EIGRP for IPv6 in a small routed network.
 - Verify EIGRP for IPv6 implementation in a small to medium sized network.
- Lesson 08: EIGRP Advanced Configurations and Troubleshooting
 - Configure EIGRP automatic summarization.
 - Configure EIGRP manual summarization.
 - Configure a router to propagate a default route in an EIGRP network.
 - Modify EIGRP interface settings to improve network performance.
 - Configure EIGRP authentication to ensure secure routing updates.
 - Explain the process and tools used to troubleshoot an EIGRP network.
 - Troubleshoot neighbor adjacency issues in an EIGRP network.
 - Troubleshoot missing route entries in an EIGRP routing table.
- Lesson 09: IOS Images and Licensing
 - Explain the IOS image naming conventions implemented by Cisco.
 - Manage Cisco IOS system image files to support network requirements in small - to medium-sized business networks.
 - Explain the licensing process for Cisco IOS software in a small - to medium-sized business network.
 - Configure a router to install a Cisco IOS software image license.

Notes to Instructors

- All instructors are to use a combination of Packet Tracer and hands on labs (via classroom equipment or the Netlab+ online lab server)
- Assignments consist of labs, quizzes, chapter tests, skills based exam, and a final exam