Virginia Western Community College
ITN 155
Switching, Wireless, and WAN Technologies (ICND2) - Cisco

Prerequisites
ITN 155

Course Description
Provides the skills and knowledge to install, operate, and troubleshoot a small-to-medium sized branch office enterprise network, including configuring several switches and routers, configuring wireless devices, configuring VLANS, connecting to a WAN, and implementing network security.

Semester Credits: 4 Lecture Hours: 3 Lab/Clinical/Internship Hours: 2

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 devices by using security best practices
- Explain how Layer 2 switches forward data.
- Implement VLANs and trunking in a switched network.
- Troubleshoot inter-VLAN routing on Layer 3 devices.
- Explain how STP enables redundancy in a Layer 2
- Troubleshoot EtherChannel on switched links.
- Implement DHCPv4 to operate across multiple LANs.
- Configure dynamic address allocation in IPv6 networks.
- Explain how FHRPs provide default gateway services in a redundant network.
- Explain how vulnerabilities compromise LAN security.
- Implement switch security to mitigate LAN attacks.
- Explain how WLANs enable network connectivity.
- Implement a WLAN using a wireless router and WLC.
- Explain how routers use information in packets to make forwarding decisions.

- Configure IPv4 and IPv6 static routes.
- Troubleshoot static and default route configurations.

Topical Description

CCNAv7: SRWE		
Module	**Topic**	**Objective**
Basic Device Configuration		Configure devices by using security best practices.
	Configure a Switch with Initial Settings	Configure initial settings on a Cisco switch.
	Configure Switch Ports	Configure switch ports to meet network requirements
	Secure Remote Access	Configure secure management access on a switch.
	Basic Router Configuration	Configure basic settings on a router, using CLI, to route between two directly-connected networks.
	Verify Directly Connected Networks	Verify connectivity between two networks that are directly connected to a router.
Module	**Topic**	**Objective**
Switching Concepts		Explain how Layer 2 switches forward data.
	Frame Forwarding	Explain how frames are forwarded in a switched network.
	Switching Domains	Compare a collision domain to a broadcast domain.
Module	**Topic**	**Objective**
VLANs		Implement VLANs and trunking in a switched network.
	Overview of VLANs	Explain the purpose of VLANs in a switched network.
	VLANs in a Multi-Switched Environment	Explain how a switch forwards frames based on VLAN configuration in a multi-switch environment.
	VLAN Configuration	Configure a switch port to be assigned to a VLAN based on requirements.
	VLAN Trunks	Configure a trunk port on a LAN switch.
	Dynamic Trunking Protocol	Configure Dynamic Trunking Protocol (DTP).

Module	Topic	Objective
Inter-VLAN Routing		Troubleshoot inter-VLAN routing on Layer 3 devices.
	Inter-VLAN Routing Operation	Describe options for configuring inter-VLAN routing.
	Router-on-a-Stick Inter-VLAN Routing	Configure router-on-a-stick inter-VLAN routing.
	Inter-VLAN Routing using Layer 3 Switches	Configure inter-VLAN routing using Layer 3 switching.
	Troubleshoot Inter-VLAN Routing	Troubleshoot common inter-VLAN configuration issues
Module	**Topic**	**Objective**
STP		Explain how STP enables redundancy in a Layer 2
	Purpose of STP	Explain common problems in a redundant, L2 switched network.
	STP Operations	Explain how STP operates in a simple, switched network.
	Evolution of STP	Explain how Rapid PVST+ operates.
Module	**Topic**	**Objective**
EtherChannel		Troubleshoot EtherChannel on switched links.
	EtherChannel Operation	Describe EtherChannel technology.
	Configure EtherChannel	Configure EtherChannel.
	Verify and Troubleshoot EtherChannel	Troubleshoot EtherChannel.
Module	**Topic**	**Objective**

DHCPv4		Implement DHCPv4 to operate across multiple LANs.
	DHCPv4 Concepts	Explain how DHCPv4 operates across multiple LANs.
	Configure DHCPv4 Server	Configure a router as a DHCPv4 server.
	Configure DHCPv4 Client	Configure a router as a DHCPv4 client.
Module	**Topic**	**Objective**
SLAAC and DHCPv6 Concepts		Configure dynamic address allocation in IPv6 networks.
	IPv6 Global Unicast Address Assignment	Explain how an IPv6 host can acquire its IPv6 configuration.
	SLAAC	Explain the operation of SLAAC.
	DHCPv6	Explain the operation of DHCPv6.
	Configure DHCPv6 Server	Configure a stateful and stateless DHCPv6 server.
Module	**Topic**	**Objective**
FHRP Concepts		Explain how FHRPs provide default gateway services in a redundant network.
	First Hop Redundancy Protocol	Explain the purpose and operation of first hop redundancy protocols.
	HSRP	Explain how HSRP operates.
Module	**Topic**	**Objective**
LAN Security Concepts		Explain how vulnerabilities compromise LAN security.
	Endpoint Security	Explain how to use endpoint security to mitigate attacks.

	Access Control	Explain how AAA and 802.1x are used to authenticate LAN endpoints and devices.
	Layer 2 Security Threats	Identify Layer 2 vulnerabilities.
	MAC Address Table Attack	Explain how a MAC address table attack compromises LAN security.
	LAN Attacks	Explain how LAN attacks compromise LAN security.
Module	**Topic**	**Objective**
Switch Security Configuration		Implement switch security to mitigate LAN attacks.
	Implement Port Security	Implement port security to mitigate MAC address table attacks.
	Mitigate VLAN Attacks	Explain how to configure DTP and native VLAN to mitigate VLAN attacks.
	Mitigate DHCP Attacks	Explain how to configure DHCP snooping to mitigate DHCP attacks.
	Mitigate ARP Attacks	Explain how to configure ARP inspection to mitigate ARP attacks.
	Mitigate STP Attacks	Explain how to configure Portfast and BPDU Guard to mitigate STP attacks.
Module	**Topic**	**Objective**
WLAN Concepts		Explain how WLANs enable network connectivity.
	Introduction to Wireless	Describe WLAN technology and standards.
	Components of WLANs	Describe the components of a WLAN infrastructure.
	WLAN Operation	Explain how wireless technology enables WLAN operation.
	CAPWAP Operation	Explain how a WLC uses CAPWAP to manage multiple APs.

	Channel Management	Describe channel management in a WLAN.
	WLAN Threats	Describe threats to WLANs.
	Secure WLANs	Describe WLAN security mechanisms.
Module	**Topic**	**Objective**
WLAN Configuration		Implement a WLAN using a wireless router and WLC.
	Remote Site WLAN Configuration	Configure a WLAN to support a remote site.
	Configure a Basic WLC on the WLC	Configure a WLC WLAN to use the management interface and WPA2 PSK authentication.
	Configure a WPA2 Enterprise WLAN on the WLC	Configure a WLC WLAN to use a VLAN interface, a DHCP server, and WPA2 Enterprise authentication.
	Troubleshoot WLAN Issues	Troubleshoot common wireless configuration issues.
Module	**Topic**	**Objective**
Routing Concepts		Explain how routers use information in packets to make forwarding decisions.
	Path determination	Explain how routers determine the best path.
	Packet Forwarding	Explain how routers forward packets to the destination.
	Basic Router Configuration review	Configure basic settings on a Cisco IOS router.
	IP Routing Table	Describe the structure of a routing table.
	Static and Dynamic Routing	Compare static and dynamic routing concepts.

Module	Topic	Objective
IP Static Routing		Configure IPv4 and IPv6 static routes.
	Static Routes	Describe the command syntax for static routes.
	Configure IP Static Routes	Configure IPv4 and IPv6 static routes.
	Configure IP Default Static Routes	Configure IPv4 and IPv6 default static routes.
	Configure Floating Static Routes	Configure a floating static route to provide a backup connection.
	Configure Static Host Routes	Configure IPv4 and IPv6 static host routes that direct traffic to a specific host.
Module	**Topic**	**Objective**
Troubleshoot Static and Default Routes		Troubleshoot static and default route configurations.
	Packet Processing with Static Routes	Explain how a router processes packets when a static route is configured.
	Troubleshoot IPv4 Static and Default Route Configuration	Troubleshoot common static and default route configuration issues.

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
- Skill based exam will be used for SLO assessment. This assignment must be completed by every student.