CIST 2452 - Cisco Switching, Routing & Wireless Essentials (version 202014L)

Course Title	Course Development	Learning Support
Cisco Switching, Routing & Wireless Essentials	Standard	No

Course Description

This course focuses on switching technologies and router operations that support small-to-medium business networks and includes wireless local area networks (WLANs) and security concepts. Students learn key switching and routing concepts. They can perform basic network configuration and troubleshooting, identify and mitigate LAN security threats, and configure and secure a basic WLAN.

Pre-requisites

Pre-requisites: None

Regstr. Co-requisites

Regstr. Co-requisites: All Required

CIST 2451 - Introduction to Networks - CISCO (202014L)

True Co-requisites

True Co-requisites: None

Course Length

	Lecture Contact Time	Regular Lab Type	Reg. Lab Contact Time	Other Lab Type	Oth. Lab Contact Time	Total Contact Hrs
Contact Hours Per Week	2 hrs	Lab	4 hrs	N/A	0 hrs	6 hrs
Contact Min/Hrs Per Semester	1500 min		3000 min		0 min	90 hrs

	Lecture Credit Hours	Lab Credit Hours	Total Credit hours	WLU
Semester Credit Hours	2	2	4	142.5

Competencies & Outcomes

Order	Description

1   Basic Device Configuration

Order	Description	Learning Domain	Level of Learning
1	Configure devices by using security best practices.	Cognitive	Application
2	Configure initial settings on a Cisco switch.	Psychomotor	Guided Response
3	Configure switch ports to meet network requirements.	Psychomotor	Guided Response
4	Configure switch ports to meet network requirements.	Psychomotor	Guided Response
5	Configure secure management access on a switch.	Psychomotor	Guided Response
6	Configure basic settings on a router, using CLI, to route between two directly-connected networks.	Psychomotor	Guided Response

Order	Description	Learning Domain	Level of Learning
7	Verify connectivity between two networks that are directly connected to a router.	Psychomotor	Guided Response

2   Switching Concepts

Order	Description	Learning Domain	Level of Learning
1	Explain how Layer 2 switches forward data.	Cognitive	Comprehension
2	Explain how frames are forwarded in a switched network.	Cognitive	Comprehension
3	Compare a collision domain to a broadcast domain.	Cognitive	Analysis

3   VLANs

Order	Description	Learning Domain	Level of Learning
1	Implement VLANs and trunking in a switched network.	Psychomotor	Guided Response
2	Explain the purpose of VLANs in a switched network.	Cognitive	Comprehension
3	Explain how a switch forwards frames based on VLAN configuration in a multi-switch environment.	Cognitive	Comprehension
4	Configure a switch port to be assigned to a VLAN based on requirements.	Psychomotor	Guided Response
5	Configure a trunk port on a LAN switch.	Psychomotor	Guided Response
6	Configure Dynamic Trunking Protocol (DTP).	Psychomotor	Guided Response

4   Inter-VLAN Routing

Order	Description	Learning Domain	Level of Learning
1	Troubleshoot inter-VLAN routing on Layer 3 devices.	Cognitive	Evaluation
2	Describe options for configuring inter-VLAN routing.	Cognitive	Knowledge
3	Configure router-on-a-stick inter-VLAN routing.	Psychomotor	Guided Response
4	Configure inter-VLAN routing using Layer 3 switching.	Psychomotor	Guided Response
5	Troubleshoot common inter-VLAN configuration issues	Cognitive	Evaluation

5   STP

Order	Description	Learning Domain	Level of Learning
1	Explain how STP enables redundancy in a Layer 2 network.	Cognitive	Comprehension
2	Explain common problems in a redundant, L2 switched network.	Cognitive	Comprehension
4	Explain how STP operates in a simple, switched network.	Cognitive	Comprehension

Order	Description	Learning Domain	Level of Learning
6	Explain how Rapid PVST+ operates.	Cognitive	Comprehension

6 EtherChannel

Order	Description	Learning Domain	Level of Learning
2	Describe EtherChannel technology	Cognitive	Knowledge
3	Configure EtherChannel.	Psychomotor	Guided Response
4	Troubleshoot EtherChannel.	Cognitive	Evaluation

7 DHCPv4

Order	Description	Learning Domain	Level of Learning
1	Explain how DHCPv4 operates across multiple LANs.	Cognitive	Comprehension
2	Configure a router as a DHCPv4 server.	Psychomotor	Guided Response
3	Configure a router as a DHCPv4 client.	Psychomotor	Guided Response
4	Implement DHCPv4 to operate across multiple LANs.	Psychomotor	Guided Response

8 SLAAC and DHCPv6 Concepts

Order	Description	Learning Domain	Level of Learning
1	Configure dynamic address allocation in IPv6 networks.	Psychomotor	Guided Response
2	Explain how an IPv6 host can acquire its IPv6 configuration.	Cognitive	Comprehension
3	Explain the operation of DHCPv6.	Cognitive	Comprehension
4	Configure a stateful and stateless DHCPv6 server.	Psychomotor	Guided Response

9 FHRP Concepts

Order	Description	Learning Domain	Level of Learning
1	Explain how FHRPs provide default gateway services in a redundant network.	Cognitive	Comprehension
2	Explain the purpose and operation of first hop redundancy protocols.	Cognitive	Comprehension
3	Explain how HSRP operates.	Cognitive	Comprehension

10 LAN Security Concepts

Order	Description	Learning Domain	Level of Learning
1	Explain how vulnerabilities compromise LAN security.	Cognitive	Comprehension

	2	Explain how to use endpoint security to mitigate attacks.	Cognitive	Comprehension
	4	Explain how AAA and 802.1x are used to authenticate LAN endpoints and devices.	Cognitive	Comprehension
	5	Identify Layer 2 vulnerabilities.	Cognitive	Knowledge
	6	Explain how a MAC address table attack compromises LAN security.	Cognitive	Comprehension
	7	Explain how LAN attacks compromise LAN security.	Cognitive	Comprehension

11   Switch Security Configuration

Order	Description	Learning Domain	Level of Learning
1	Implement port security to mitigate MAC address table attacks.	Psychomotor	Guided Response
2	Explain how to configure DTP and native VLAN to mitigate VLAN attacks.	Cognitive	Comprehension
3	Explain how to configure DHCP snooping to mitigate DHCP attacks.	Cognitive	Comprehension
4	Explain how to configure ARP inspection to mitigate ARP attacks.	Cognitive	Comprehension
5	Explain how to configure Portfast and BPDU Guard to mitigate STP attacks.	Cognitive	Comprehension

12   WLAN Concepts

Order	Description	Learning Domain	Level of Learning
1	Explain how WLANs enable network connectivity.	Cognitive	Knowledge
2	Describe WLAN technology and standards.	Cognitive	Knowledge
3	Describe the components of a WLAN infrastructure.	Cognitive	Knowledge
4	Explain how wireless technology enables WLAN operation.	Cognitive	Comprehension
5	Explain how a WLC uses CAPWAP to manage multiple APs.	Cognitive	Comprehension
6	Describe channel management in a WLAN.	Cognitive	Knowledge
7	Describe threats to WLANs.	Cognitive	Knowledge
8	Describe WLAN security mechanisms.	Cognitive	Knowledge

13   WLAN Configuration

Order	Description	Learning Domain	Level of Learning
1	Implement a WLAN using a wireless router and WLC.	Psychomotor	Guided Response
2	Configure a WLAN to support a remote site.	Psychomotor	Guided Response
4	Configure a WLC WLAN to use the management interface and WPA2 PSK authentication.	Psychomotor	Guided Response
5	Configure a WLC WLAN to use a VLAN interface, a DHCP server, and WPA2 Enterprise authentication.	Psychomotor	Guided Response

	6	Troubleshoot common wireless configuration issues.	Cognitive	Evaluation

14 **Routing Concepts**

Order	Description	Learning Domain	Level of Learning
1	Explain how routers use information in packets to make forwarding decisions.	Cognitive	Comprehension
2	Explain how routers determine the best path.	Cognitive	Comprehension
3	Explain how routers forward packets to the destination.	Cognitive	Comprehension
4	Configure basic settings on a Cisco IOS router.	Psychomotor	Guided Response
5	Describe the structure of a routing table.	Cognitive	Knowledge
6	Compare static and dynamic routing concepts.	Cognitive	Analysis

15 **IP Static Routing**

Order	Description	Learning Domain	Level of Learning
1	Configure IPv4 and IPv6 static routes.	Psychomotor	Guided Response
2	Describe the command syntax for static routes.	Cognitive	Knowledge
3	Configure IPv4 and IPv6 static routes.	Psychomotor	Guided Response
4	Configure IPv4 and IPv6 default static routes.	Psychomotor	Guided Response
5	Configure a floating static route to provide a backup connection.	Psychomotor	Guided Response
7	Configure IPv4 and IPv6 static host routes that direct traffic to a specific host.	Psychomotor	Complex Response

16 **Troubleshoot Static and Default Routes**

Order	Description	Learning Domain	Level of Learning
1	Troubleshoot static and default route configurations.	Psychomotor	Complex Response
2	Explain how a router processes packets when a static route is configured.	Cognitive	Comprehension
3	Troubleshoot common static and default route configuration issues	Psychomotor	Complex Response