CISCO NETWORKING ACADEMY PROGRAM CURRICULUM
SCOPE & SEQUENCE

Semester 2 version 2.1

Course Description:
The Cisco Networking Academy Program consists of four semesters. The program is designed to teach students the skills they will need to design, build, and maintain small to medium size networks. This provides them with the opportunity to enter the workforce and/or further their education and training in the computer networking field.

CHAPTER 1

Upon completion of this chapter, students will be able to perform tasks related to:

The OSI Model
- Layered networked model
- The OSI layered model functions
- Peer-to-peer communications
- Five steps of data encapsulation

LANs
- LAN devices and technologies
- Ethernet and IEEE 802.3 standards
- Carrier sense multiple access with collision detection
- Logical (IP) addressing
- MAC addressing

TCP/IP Addressing
- TCP/IP environment
- Subnetworks

Host Layer (the Upper 4 Layers of the OSI Model)
- Application, presentation and session layers
- Transport layer
- Transport layer functions

CHAPTER 2

Upon completion of this chapter, students will be able to perform tasks related to:

WANs
- WANs and devices
- WAN standards
- WAN technologies

WANs and Routers
- Router Basics
- The function of a router in a WAN
- Semester 2 lab topology

CHAPTER 3

Upon completion of this chapter, students will be able to perform tasks related to:

Router User Interface
- User and privileged modes

- User mode command list
- Privileged-mode command list
- User router help functions
- Using IOS editing commands
- Using IOS command history

Using The Router Interface and Interface Modes
- Lab: Router user interface
- Lab: Router user interface modes

CHAPTER 4

Upon completion of this chapter, students will be able to perform tasks related to:

Router Components
- External router configuration sources
- External router configuration compoments
- RAM for working storage in the router
- Router modes

Router Show Commands
- Examining router status by using router status commands
- The show running-config and show startup-config commands
- The show interfaces, show version and show protocols commands
- Router Show Commands

Router's Network Neighbors
- Gaining Access to Other Routers by Using Cisco Discovery Protocol (CDP)
- Showing CDP neighbor entries
- A CDP configuration example
- Showing CDP entries for a device and CDP neighbors
- Lab: CDP Neighbors

Basic Networking Testing
- Testing process that uses the OSI model
- Testing the application layer by using telnet
- Testing the network layer using the ping command
- Testing the network layer with the trace command
- Testing network layer with the show ip route command.
- Using the show interfaces serial command to test the physical and data link layers
- The show interfaces and clear counters commands
- Checking real-time traffic with debug

Challenge Lab
- Troubleshooting tools challenge

CHAPTER 5

Upon completion of this chapter, students will be able to perform tasks related to:

Router Boot Sequence and Setup Mode
- Router startup routine
- Router startup sequence
- Commands related to router startup

System Configuration Dialog
- Using the setup command
- Setting up global parameters
- Setting up interface parameters
- Setting up script review and use

Challenge Lab

- Router Setup Lab

CHAPTER 6

Upon completion of this chapter, students will be able to perform tasks related to:

Router Configuration Files

- Router configuration file information
- Working with Release 11.x configuration files
- Working with pre-Release 11.0 configuration files
- Using the copy running-config tftp and copy tftp running-config commands
- Describe using NVRAM with Release 11.x.
- Using NVRAM with Pre-11.0 IOS software

Router Configuration Modes

- Using router configuration modes
- Global configuration modes
- Configuring routing protocols
- Interface configuration commands
- Configuring a specific interface

Configuration methods

- Release 11.x configuration methods
- Pre-Release 11.0 configuration methods
- Password configuration methods
- Router identification configuration

Challenge Labs

- Configuration Labs
- Cisco Configmaker
- Router config. web browser

CHAPTER 7

Upon completion of this chapter, students will be able to perform tasks related to:

The Basics of IOS Versions

- Locating the Cisco IOS software
- Configuration register values
- The show version command

Bootstrap Options in Software

- Boot system commands
- Preparing for the use of TFTP
- The show flash command.

IOS Naming and Software Image Backup

- Cisco's IOS naming conventions
- The copy flash tftp command.
- The copy tftp flash command.
- How to load a software image backup

CHAPTER 8

Upon completion of this chapter, students will be able to perform tasks related to:

Configuring a Router from the CLI after Start-up Config has been Erased

- Router configuration process
- Router password recovery procedure on 1600 and 2500 series routers

Router Configuration Lab
- Individual Router Config.

CHAPTER 9

Upon completion of this chapter, students will be able to perform tasks related to:

The TCP/IP Protocol Suite
- The Internet TCP/IP protocols and the OSI model
- NTCP/IP protocol stack and the application layer
- NTCP/IP protocol stack and the transport layer
- TCP and UDP segment format
- TCP and UDP port numbers
- TCP three-way handshake/open connection
- TCP simple acknowledgment and windowing

2 Layer 3 Concepts
- TCP/IP and the Internet Layer
- Diagram the IP Datagram
- Internet Control Message Protocol (ICMP)
- How ARP works
- How RARP works

CHAPTER 10

Upon completion of this chapter, students will be able to perform tasks related to:

IP addressing and subletting
- The purpose of IP address
- The role of host address on a routed network
- The role of broadcast addresses on a routed network
- The assignment of router interface and network IP addresses

The Role of DNS in Router Configurations
- The IP address command
- The IP host command
- Describe the IP name-server command
- How to enable and disable DNS on a router
- Show hosts command

Verifying Address Configuration
- Verification commands
- The telenet and ping commands
- The trace command

Assigning New Subnet Numbers to the Topology
- Topology challenge lab

CHAPTER 11

Upon completion of this chapter, students will be able to perform tasks related to:

Routing Basics
- Path determination
- How routers route packets from source to destination

- Network and host addressing
- Path selection and packet switching
- Routed versus routing protocol
- Network-layer protocol operations
- Multiprotocol routing

Why Routing Protocols are Necessary
- Static versus dynamic routes
- Why use a static route
- How a default route is used
- Why dynamic routing is necessary
- Dynamic routing operations
- How distances on network paths are determined by various metrics
- Three classes of routing protocols
- Time to convergence

Distance-Vector Routing
- Distance-vector routing basics
- How distance-vector protocols exchange routing tables
- How topology changes propagate through the network of routers
- The problem of routing loops
- The problem of counting to infinity
- The solution of defining a maximum
- The solution of split horizon
- The solution of hold-down timers

Link-State Routing
- Link-state routing basics
- How link-state protocols exchange routing tables
- How topology changes propagate through the network of routers
- Two link-state concerns
- Unsynchronized link-state advertisements (LSAs) leading to inconsistent path decisions amongst routers

The Context of Different Routing Protocols
- Distance-vectors versus link-state routing protocols
- Hybrid routing protocols
- LAN-to-LAN routing
- LAN-to-WAN routing
- Path selection and switching of multiple protocols and media

CHAPTER 12

Upon completion of this chapter, students will be able to perform tasks related to:

Initial Router Configuration
- Setup mode
- The initial IP routing table
- How a router learns about destinations
- The ip route command
- Using the ip route command
- The ip default-network command
- Using the ip default-network command

Interior and Exterior Routing Protocols
- Autonomous system
- Interior versus exterior routing protocols
- Interior IP routing protocols
- IP routing configuration tasks

- Using the router and network commands

RIP

- Key elements of RIP
- Using router rip and network commands to enable RIP
- Enabling RIP on an IP-addressed network
- Monitoring of IP packet flow using the show ip protocol command
- The show ip route command

IGRP

- Key characteristics of IGRP
- Using router igrp and network commands to enable IGRP
- Enabling IGRP on an IP-addressed network
- Monitoring IP packet flow using the show ip protocol command
- The show ip interfaces command
- The show ip route command
- The debug ip rip command

Challenge Labs

- Rip convergence challenge
- Routing loops setup challenge
- Preventing routing loops

CHAPTER 13

Upon completion of this chapter, students will be able to perform tasks related to:

The Session Layer

- The session layer overview
- The session layer in terms of analogies
- Dialogue control
- Dialogue separation
- Layer 5 protocols