



Articulation Agreement Course Competencies and Provisions

CSC 156 CISCO INTERNETWORKING I

5 Credits

An introduction to computer networking, including workstation and cabling configuration, IP addressing, troubleshooting and an in-depth look at the OSI networking model.

PROVISIONS

1. High school must be a certified CISCO Academy facility.
2. Student must enroll in the required high school class.
3. Student must receive an A or B grade (minimum 2.9 or better) and complete all competencies.
4. All required Tech Prep forms must be sent to BBCC **within 30 days** of course completion.
5. Teachers must assign student grades and credits **within 30 days** of course completion.

COMPETENCIES

1. Identify and describe the functions of each of the seven layers of the OSI reference model.
2. Describe data link and network addresses and identify key differences between them.
3. Define and describe the function of a MAC address.
4. Define local area network media and topologies
5. List the key internetworking functions of the OSI Network layer.
6. Identify at least three reasons why the industry uses a layered model.
7. Describe the two parts of network addressing, then identify the parts in specific protocol address examples.
8. Identify the functions of each layer of the ISO/OSI reference model.
9. Identify and describe the functions internetworking devices.
10. Define and explain the five conversion steps of data encapsulation.
11. Describe the different classes of IP address (and sub-netting).
12. Identify the functions of the TCP/IP network-layer protocols.



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CSC 157 CISCO INTERNETWORKING II

5 Credits

A continuation of the concepts introduced in Cisco Networking I. Router configuration and routing protocols are introduced and discussed. The Internet Operating System is introduced. The TCP/IP protocol is discussed in detail. Differences in routed and routing protocols will be discussed.

PROVISIONS

1. High school must be a certified CISCO Academy facility.
2. Prerequisite CISCO Networking Level I.
3. Student must receive an A or B grade (minimum 2.9 or better) and complete all competencies.
4. All required Tech Prep forms must be sent to BBCC **within 30 days** of course completion.
5. Teachers must assign student grades and credits **within 30 days** of course completion.

COMPETENCIES

1. Examine router elements (RAM, ROM, DCP, show)
2. Describe connection-oriented network service and connectionless network service, and identify their key differences.
3. Define flow control and describe the three basic methods used in networking.
4. Identify the functions of the TCP/IP transport-layer protocols
5. Manage IOS configuration files.
6. Identify the functions performed by the Internet Control Message Protocol (ICMP).
7. Control router passwords, identification and banner.
8. Identify the main CISCO IOS™.
9. Use software commands for router startup.
10. Check an initial IOS configuration using the setup command.
11. Log in to a router in both user and privileged modes.
12. Use the context-sensitive help facility.
13. Use the command history and editing features
14. List the commands to load CISCO IOS software from: flash memory, a TFTP server, or ROM.
15. Prepare to backup, upgrade, and load a backup CISCO IOS software image.
16. List problems that each routing type encounters when dealing with topology changes, and describe techniques to reduce the number of these problems.
17. Configure and verify IP addresses
18. Prepare the initial configuration of your router and enable IP
19. Add the RIP routing protocol to your configuration.
20. Add the Interior Gateway Routing Protocol (IGRP) to your configuration.
21. Configure standard access lists to figure IP traffic.
22. Monitor and verify selected access list operations on the router.
23. Configure extended access lists to filter IP traffic.
24. Monitor and verify selected access list operations on the router.



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CSC 158 CISCO INTERNETWORKING III

5 Credits

A continuation of the concepts introduced in CISCO Internetworking I & II. VLAN concepts are introduced. The student will develop a Network Design Threaded Case Study. Access Control Lists, Cisco routers in Novell networks, and network security will be introduced and discussed.

PROVISIONS

1. High school must be a certified CISCO Academy facility.
2. Prerequisite complete CISCO Networking Levels I & II.
3. Student must receive an A or B grade (minimum 2.9 or better) and complete all competencies.
4. All required Tech Prep forms must be sent to BBCC **within 30 days** of course completion.
5. Teachers must assign student grades and credits **within 30 days** of course completion.

COMPETENCIES

1. List the required IPX™
2. Define address and encapsulation type.
3. Configure IPX access lists and SAP filters to control basic Novell traffic.
4. Enable the Novell IPX protocol and configuration interfaces.
5. Monitor Novell IPX operation on the router.
6. Describe the advantages of LAN segmentation.
7. Describe LAN segmentation using bridges.
8. Describe LAN segmentation using routers.
9. Describe LAN segmentation using switches.
10. Name and describe two switching methods.
11. Describe full-and half-duplex Ethernet operation.
12. Describe network congestion problem in Ethernet networks.
13. Describe the benefits of network segmentation with bridges.
14. Describe the benefits of network segmentation with routers.
15. Describe the benefits of network segmentation with switches.
16. Describe the features and benefits of Fast Ethernet.
17. Describe the guidelines and distance limitations of Fast Ethernet.
18. Distinguish between cut-through and store-and-forward LAN switching.
19. Describe the operation of the Spanning Tree Protocol and its benefits.
20. Describe the benefits of virtual LANs.
21. Add and configure the IGRP protocol to the router configuration.
22. Configure standard and extended access control lists to filter IP traffic.
23. Monitor and verify access control list operation on the router.



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CSC 159 CISCO INTERNETWORKING IV

5 Credits

A continuation of the concepts introduced in Cisco Internetworking I, II, and III as well as LAN switching; Wide Area Network (WAN) technology and devices; Point-to-Point Protocol (PPP) Integrated Services Digital Network (ISDN), and Frame Relay technologies. The Network Design Threaded Case Study project will be continued from Cisco Internetworking II. Network management will be discussed in detail.

PROVISIONS

1. High school must be a certified CISCO Academy facility.
2. Prerequisite CISCO Networking Levels I, II, & III.
3. Student must receive an A or B grade (minimum 2.9 or better) and complete all competencies.
4. All required Tech Prep forms must be sent to BBCC **within 30 days** of course completion.
5. Teachers must assign student grades and credits **within 30 days** of course completion.

COMPETENCIES

1. Describe Wide Area Network (WAN) concepts, technologies and devices.
2. Define how to apply WAN concepts, technologies and devices to a WAN design.
3. Differentiate between the following:
 - Wide Area Network services (WAN)
 - Link Access Procedure Protocol Balanced (LAPB)
 - Frame Relay
 - Integrated Services Digital Network/Link Access Procedure (ISDN/LAPD)
 - D Channel (ISDN/LAPD) Integrated Services Digital Network/Link Access Procedure
 - High-Level Data Link Control (HDLC)
 - Point to Point Protocol (PPP), and
 - Dial-on-Demand Routing (DDR)
4. Recognize key Frame Relay terms and features.
5. List commands to configure Frame Relay Local Management Interfaces (LMI's), route maps, and sub-interfaces.
6. Apply WAN capabilities to the router using specific configuration commands.
7. List commands to monitor Frame Relay operation in the router.
8. Identify Point to Point (PPP) operations to encapsulate WAN data on CISCO routers.
9. State a relevant use and context for ISDN networking.
10. Identify ISDN protocols, function groups, reference points, and channels.
11. Describe CISCO's implementation of ISDN Basic Rate Interface (BRI).
12. Describe how to monitor the network traffic and hardware.
13. Devise a method of analyzing, recognizing and correcting basic network problems.
14. Define and describe networking concepts and terms.
15. Design a network structure.
16. Describe how to maintain a network in a fully operational condition.