



## Course Articulation Agreement Procedures and Provisions

### CSC156 - 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.

### CSC157 - 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.

### CSC158 - 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.

### CSC159 - 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.

## STUDENT PROCEDURES

1. Enroll in the required high school class.
2. Register for Tech Prep dual credit at [www.bigbend.edu/techprep](http://www.bigbend.edu/techprep).
3. Register for the Tech Prep dual credit articulated course during the same academic year the high school class is completed. If a series of courses are involved in the articulation, students register for credit during the same academic year the last course in the series is completed. **Students cannot earn "retroactive credit" for courses taken in previous years.**
4. Earn a grade of 'B' (**3.0**) or better in all courses required under the articulation agreement.
5. Complete all required skills as identified on the competency profile.
6. If an exam or review of completed work is required under the terms of this agreement, students must receive a passing score (determined by college or industry certification) to earn college credit.

## TEACHER PROCEDURES

1. Ensure all students receive a copy of the course syllabus outlining information about Tech Prep, the college course competencies, and the process required to earn college credit. See attached "College Tech Prep Notice to Students."
2. Hold students accountable for the same competency standard and course expectations as required by the college-equivalent course (*see competency list attached*).
3. If required for articulation, ensure students are prepared to take industry certification exams, complete a professional portfolio documenting their work, or take a final exam to measure their level of skill and competence in the coursework.

4. Submit final grades for all students registered to earn Tech Prep college credit **within 30 days** of high school course completion.
5. Attend scheduled meetings, workshops or in-service activities that enhance the high school/college partnership and support implementation of the Tech Prep articulated program.

#### **ARTICULATION PROVISIONS**

1. High school must be a certified CISCO Academy facility.
2. At this time this articulation is only active for **Columbia Basin Job Corps**.
3. Before enrolling in CSC157, student must complete Cisco Networking I
4. Before enrolling in CSC158, student must complete Cisco Networking I & II
5. Before enrolling in CSC159, student must complete Cisco Networking I, II, & III.

## COURSE COMPETENCIES

### CSC156 CISCO Internetworking I

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, and 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.

### CSC157 CISCO Internetworking II

1. Examine router elements (RAM, ROM, CDP, 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.

**CSC158 CISCO Internetworking III**

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.

**CSC159 CISCO Internetworking IV**

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.

## College Tech Prep Notice to Students

(This must be included in high school syllabus.)

If you are requesting an articulation update or renewal, the high school syllabus MUST include a notice to students indicating the course is Tech Prep approved and articulated with one or more colleges. The following statement is a **sample** notice. You can use/modify the statement below to include in your syllabus:

### Example:

This course is College Tech Prep approved and articulated with Big Bend Community College and the **Computer Science Technology** program area. Students, who demonstrate proficiency of the college course competencies with a 'B' (3.0) or better grade, may earn college credit through the Tech Prep dual credit registration process. The college competencies are attached to this syllabus. During the (semester/year) all competencies will be covered in class...some may require additional independent work by the student. To earn college credit students are required to pass a skill check/assessment with the high school instructor.

Students may earn credit for the following college course(s):

          CSC156           College Course Number                                5 Credits          

Cisco Internetworking I College Course Name

          CSC157           College Course Number                                5 Credits          

Cisco Internetworking II College Course Name

          CSC158           College Course Number                                5 Credits          

Cisco Internetworking III College Course Name

          CSC159           College Course Number                                5 Credits          

Cisco Internetworking IV College Course Name