

Course Outline Status: Active

TOP Code: 0708.10 - Computer Networking* Board Approval 07/06/2011
Date:
Technical Review Approval Date: 04/08/2011
CRC Approval Date: 04/13/2011

MISSION COLLEGE
Associate and Non-Associate Degree
Credit Course Outline

SECTION ONE - Course Specific Information

1. **Type of Credit Course:**

Degree Applicable Non Degree Applicable

2. **Course Number and Title:**

CIT 024 - Accessing the WAN (Cisco-4)
Formerly: CIT 024 Accessing the WAN (Cisco)

3. **General Information:**

4 **Total Units** (Based on 16-18 hours per semester for 1 lecture unit, and 48-54 hours per semester for 1 lab unit)

Number of Lecture Units: 3

Number of Student Contact Hours Per Semester: 54

Total hours of student work required outside of class per semester: 108

Number of Laboratory Units: 1

Number of Student Contact Hours Per Semester: 54

Number of Arranged Lab Units: 0

Number of Student Contact Hours Per Semester: 0

Total Hours of Student Work Required Per Semester: 216

Number of Work Experience Units: 0

Students must complete 0 hours of unpaid work experience, or 0 hours of paid work experience, per semester.

Other Contact Hours: 0

Distance Learning: Yes

4. **Size of Class:**

Optimal Class Size based on instructional methodology described: 20

5. **Grade Type:**

Pass/No Pass Option

6. **Repeatability:**

A student who has previously earned a passing grade in the course may repeat this course 0 time(s).

7. **Recommended for Credit By Examination:**

Yes

8. **Catalog Description**

This course is the fourth of four courses leading to the CCNA designation. This course discusses the WAN technologies and network services required by converged applications in Enterprise networks. The course uses the Cisco Network Architecture to introduce integrated network services and explains how to select the appropriate devices and technologies to meet network requirements. Students learn how to implement and configure common data link protocols and how to apply WAN security concepts, principles of traffic, access control, and addressing services. Finally, students learn how to detect, troubleshoot, and correct common enterprise network implementation issues.

9. **Description for the Schedule of Classes**

This course is the fourth of four courses leading to the CCNA designation. This course discusses the WAN technologies and network services required in Enterprise networks.

10. **Content Review**

List any prerequisites, corequisites, and advisories here.

Advisory

Eligibility for ENGL 001A and READ 053

Prerequisite CIT 023

11. **Instructional Methodology:**

Collaborative Learning

Demonstrations

Guest Speakers
Hands-on Activities/Exercises
In-Class Writing
Presentations
Laboratory
Simulations
Small Group Discussion
Web-based
Activities/Exercises
Lecture
Distance Education

SECTION TWO - Course Content

1. Course Content and Scope

1. Student Course Objectives

Upon completion of the course the student should be able to:

1. Describe the impact of Voice Over IP and Video Over IP applications on a network.
2. Identify and correct common network problems at layers 1, 2, 3, and 7 using a layered model approach.
3. Interpret network diagrams.
4. Describe the components required for network and Internet communications.
5. Implement basic switch security measures such as port security, trunk access, and management VLANs.
6. Explain the operation and benefits of DHCP and DNS.
7. Configure, verify, and troubleshoot DHCP and DNS operations on a router.
8. Describe current network security threats and explain how to implement a comprehensive security policy to mitigate common threats to network devices, hosts, and applications.
9. Describe the functions of common security appliances and applications.
10. Describe recommended security practices to secure network devices.
11. Describe the purpose and types of access control lists (ACLs).
12. Configure and apply ACLs based on network filtering requirements.
13. Configure and apply an ACLs to limit Telnet and SSH access to the router using the Security Device Manager command-line interface (SDM/CLI).
14. Verify, monitor, and troubleshoot ACLs in a network environment.
15. Explain the basic operation of Network Address Translation (NAT).
16. Configure NAT for given network requirements using SDM/CLI.
17. Troubleshoot NAT issues.
18. Describe different methods for connecting to a WAN.
19. Configure and verify a basic WAN serial connection.
20. Configure and verify a Point-to-Point Protocol (PPP) connection between

- Cisco routers.
21. Configure and verify Frame Relay on Cisco routers.
 22. Troubleshoot WAN implementation issues.
 23. Describe the importance, benefits, role, impact, and components of VPN technology.

2. Outline of Topics to be Addressed

- 1) Introduction to WANS
 - a) Providing Integrated Services to the Enterprise
 - b) WAN Technology Concepts
 - c) AN Connection Options
 - d) Labs
- 2) PPP
 - a) Serial Point-to-Point Links
 - b) PPP Concepts
 - c) Configuring PPP
 - d) Configuring PPP with Authentication
 - e) Labs
- 3) Frame Relay
 - a) Basic Frame Relay Concepts
 - b) Configuring Frame Relay
 - c) Advanced Frame Relay Concepts
 - d) Configuring Advanced Frame Relay
 - e) Labs
- 4) Network Security
 - a) Introduction to Network Security
 - b) Securing Cisco Routers
 - c) Secure Router Network Services
 - d) Using Cisco SDM
 - e) Secure Router Management
 - f) Labs
- 5) ACLs

- a) Using ACLs to Secure Networks
 - b) Configuring Standard ACLs
 - c) Configuring Extended ACLs
 - d) Configuring Complex ACLs
 - e) Labs
- 6) Teleworker Services
- a) Business Requirements for Teleworker Services
 - b) Broadband Services
 - c) VPN Technology
- 7) IP Addressing Services
- a) DHCP
 - b) Scaling Networks with NAT
 - c) IPv6
 - d) Labs
- 8) Network Troubleshooting
- a) Establishing the Network Performance Baseline
 - b) Troubleshooting Methodologies and Tools
 - c) Common WAN Implementation Issues
 - d) Network Troubleshooting
 - e) Labs

3. Cultural Pluralism/Diversity

Multiculturalism will be emphasized by studying diversity and awareness of cultural differences in the workplace with emphasis on network related technologies. Students will work in groups and teams to develop cultural awareness and complete class assignments.

4. Lab Content

- 1) Introduction to WANS
 - a) Providing Integrated Services to the Enterprise
 - b) WAN Technology Concepts

- c) AN Connection Options
- 2) PPP
 - a) Serial Point-to-Point Links
 - b) PPP Concepts
 - c) Configuring PPP
 - d) Configuring PPP with Authentication
- 3) Frame Relay
 - a) Basic Frame Relay Concepts
 - b) Configuring Frame Relay
 - c) Advanced Frame Relay Concepts
 - d) Configuring Advanced Frame Relay
- 4) Network Security
 - a) Introduction to Network Security
 - b) Securing Cisco Routers
 - c) Secure Router Network Services
 - d) Using Cisco SDM
 - e) Secure Router Management
- 5) ACLs
 - a) Using ACLs to Secure Networks
 - b) Configuring Standard ACLs
 - c) Configuring Extended ACLs
 - d) Configuring Complex ACLs

2. Student Preparation and Evaluation

1. Textbooks and Readings

1. Textbooks

Vachon, Bob & Graziani, Rick.
Accessing the WAN. 1st ed. Cisco Press, 2008.

2. Manuals

3. Periodicals

4. Other

3. Writing/Skill Building

Students are required to write papers, compile lab notes, and answer essay questions on exams.

For example:

Write a 3-page paper on WAN topologies and traffic considerations.

4. Outside Assignments

Students have homework assignments including readings, completion of lab notes, papers, and projects.

For example:

Read chapter 5 on ACL Wildcard Masking.

Using Packet Tracer, troubleshoot a misconfigured frame relay environment. Locate and repair all errors in configuration, establish end-to-end connectivity, and print out the configuration and submit it.

5. Critical Thinking Assignments

Students must be able to evaluate and analyze problems, and develop solutions to common switching and wireless network issues.

For example:

Compare and analyze the features and functions of Cisco routing and switching products with any other vendor. Discuss in detail the features and differences.

6. Student Evaluation

Students will be evaluated using online assessment tests, projects, Lab configurations, and written assignments.

SECTION THREE - Course Support

1. Rationale for Course/Needs Assessment

Demand for computer networking professionals has increased tremendously in the last few years in the computer industry. In the Silicon Valley, the jobs for computer networking professionals include both network user levels and network system administrative levels. It is a major advantage for students to pass some of the typical industry certification tests such as A+, CCNA, CCNP to further advance their career, or

to use the certification as a basis for a change of career. The course provides an important step toward the preparation and successful completion of the CCNA test, since the curriculum comes from Cisco Systems company. Since most of our students come from the nearby computer industry, there is a great demand to offer such courses at Mission College. Other colleges offer similar courses to prepare the students for the CCNA certification test.

2. Discipline Area

(List all acceptable disciplines from state discipline list)
Computer Information Systems

3. Resources Needed or Anticipated

Computer lab. Cisco internet working equipment such as: routers, switches, and firewalls. Software: VMware

4. Plan for Evaluation of Course

In addition to Program Review, this course will be evaluated by: This course will be evaluated by students annually with a questionnaire, course feedback from Cisco Academy, and by the department every two years.

SECTION FOUR - Transferability and Classification

1. Request for Transferability

(Note: Applicable to Associate Degree Level courses only.)

• **California State University (Baccalaureate level):**

Yes

• **University of California (To be submitted to U.C.):**

No

2. Classification of Course for Major and/or General Education

(Note: Necessary for Associate Degree courses only.)

1. Are you requesting that this course be added to the requirements for a major?

Yes - CCNA

2. Are you requesting that this course satisfy a General Education requirement?

No

