Course Outline Status: Active

TOP Code: 0708.10 - Computer Networking*

Board Approval Date: 07/06/2011

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:**
   _X_ Degree Applicable ____ Non Degree Applicable

2. **Course Number and Title:**
   CIT 023 - LAN Switching and Wireless (Cisco-3)
   Formerly: CIT 023 LAN Switching and Wireless (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 third of four courses leading to the CCNA designation. This course provides a comprehensive, theoretical, and practical approach to learning the technologies and protocols needed to design and implement a converged switched network. Students learn about the hierarchical network design model and how to select devices for each layer. Students learn how to configure a switch for basic functionality and how to implement Virtual LANs, VTP, and Inter-VLAN routing in a converged network. The different implementations of Spanning Tree Protocol in a converged network are presented, and students develop the knowledge and skills necessary to implement a WLAN in a small-to-medium network.

9. **Description for the Schedule of Classes**
   This course is the third of four courses leading to the CCNA designation. This course covers the technologies and protocols needed to design and implement a converged switched network.

10. **Content Review**
    List any prerequisites, corequisites, and advisories here.
    Advisory
    Eligibility for ENGL 001A and READ 053
    Prerequisite CIT 022

11. **Instructional Methodology:**
    Collaborative Learning
    Demonstrations

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. Identify and correct common network problems at layers 1, 2, 3, and 7 using a layered model approach.
        2. Interpret network diagrams.
        3. Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts.
        4. Explain the technology and media access control method for Ethernet networks.
        5. Explain basic switching concepts and the operation of Cisco switches.
        6. Perform and verify initial switch configuration tasks including remote access management.
        7. Describe enhanced switching technologies such as VLANs, VLAN Trunking Protocol (VTP), Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and 802.1q.
        8. Describe how VLANs create logically separate networks and how routing occurs between them.
        9. Configure, verify, and troubleshoot VLANs, trunking on Cisco switches, interVLAN routing, VTP, and RSTP.
        10. Interpret the output of various show and debug commands to verify the operational status of a Cisco switched network.
        11. Verify network status and switch operation using basic utilities such as ping, traceroute, Telnet, Secure Shell (SSH), Address Resolution Protocol (ARP), and ipconfig, as well as the show and debug commands.
        12. Identify, prescribe, and resolve common switched network media issues, configuration issues, autonegotiation, and switch hardware failures.
        13. Manage Cisco IOS® Software.
        14. Manage Cisco IOS configuration files (save, edit, upgrade, and restore).
        15. Describe standards associated with wireless media, such as IEEE WI-FI Alliance and ITU/FCC.

16. Identify and describe the purpose of the components in a small wireless network, such as Service Set Identification (SSID), Basic Service Set (BSS), and Extended Service Set (ESS).
17. Identify basic configuration parameters on a wireless network to ensure that devices connect to the correct access points.
18. Compare and contrast Wi-Fi Protected Access (WPA) security features and capabilities of open, Wired Equivalent Privacy (WEP), and WPA-1/2 networks.
19. Describe common wireless-network implementation issues such as interference and misconfiguration.

2. **Outline of Topics to be Addressed**

1) LAN Design

   a) Switched LAN Architecture

   b) Matching Switches to Specific LAN Functions

2) Basic Switch Concepts and Configuration

   a) Introduction to Ethernet/802.3 LANs

   b) Forwarding Frames Using a Switch

   c) Switch Management Configuration

   d) Configuring Switch Security

3) VLANs

   a) Introducing VLAN

   b) VLAN Trunking

   c) Configure VLANs and Trunks

   d) Troubleshooting VLANs and Trunks

4) VTP

   a) VTP Concepts

   b) VTP Operation

c) Configure VTP

5) STP

a) Redundant Layer 2 Topologies

b) Introduction to STP

c) STP Convergence

d) PVST+, RSTP and Rapid PVST+

6) Inter-VLAN Routing

a) Inter-VLAN routing

b) Configuring Inter-VLAN Routing

c) Troubleshooting Inter-VLAN Routing

d) Labs

e) Basic Wireless Concepts and Configuration

7) The Wireless LAN

a) Wireless LAN Security

b) Configure Wireless LAN Access

c) Troubleshooting Simple WLAN Problems

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) LAN Design

    a) Switched LAN Architecture

    b) Matching Switches to Specific LAN Functions

2) Basic Switch Concepts and Configuration

    a) Introduction to Ethernet/802.3 LANs

    b) Forwarding Frames Using a Switch

    c) Switch Management Configuration

    d) Configuring Switch Security

3) VLANs

    a) Introducing VLAN

    b) VLAN Trunking

    c) Configure VLANs and Trunks

    d) Troubleshooting VLANs and Trunks

4) VTP

    a) VTP Concepts

    b) VTP Operation

    c) Configure VTP

5) STP

    a) Redundant Layer 2 Topologies

    b) Introduction to STP

c) STP Convergence

d) PVST+, RSTP and Rapid PVST+

6) Inter-VLAN Routing

a) Inter-VLAN routing

b) Configuring Inter-VLAN Routing

c) Troubleshooting Inter-VLAN Routing

d) Labs

e) Basic Wireless Concepts and Confi

2. **Student Preparation and Evaluation**

1. **Textbooks and Readings**

1. **Textbooks**

Lewis, Wayne.
LAN Switching and Wireless. 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 describing the three typical hierarchical design models: Access, Distribution, and Core.

4. **Outside Assignments**

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

For example:
Read the on-line Cisco material on "Basic Switch Concepts and Configuration", and be prepared to discuss in class.

Using a packet tracer, design a multi-layer network using routers, switches, and hubs.

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:
   Explain the technology and media access control method for Ethernet networks.

   Explain basic switching concepts and the operation of Cisco switches

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

Curriculum Approval Date: 04/13/2011

CID: 3313