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ITS 250.02M: CCNA 3 - Exploration - LAN Switching and Wireless

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ITS 250, LAN SWITCHING & WIRELESS

CREDITS: 3

Fall, 2013

August 26, 2013 - December 13, 2013

COURSE DESCRIPTION:

Concepts course that covers Ethernet switching, virtual LANs, spanning-tree protocol, and VLAN trunking protocol. Designing, configuring, and security a wireless network is included.

FACULTY: Penny Jakes, Associate Professor

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Phone: 406-243-7804

OFFICE HOURS:

Tuesday, 9-10, Wednesday, 12-1, Thursday 1-2, or by appointment in GH8.

COURSE IMPLEMENTATION:

Coursework (textbook) and all testing are done on-line in a multimedia format. Students need modern computer equipment capable of viewing text, html, audio, video, and flash animation. This is a hybrid course in which the online portion, simulations, and chapter tests are done on own and class meets 10-12 on Thursdays for lab in HB3. Hands-on labs and e-labs using simulation techniques are utilized.

PREREQUISITE: ITS 152

PERFORMANCE OUTCOMES:

At completion of course, students will be able to:

1. Configure a switch for basic functionality in a converged network.
2. Implement Virtual LANs (VLANs) in a converged network.
3. Implement the VLAN trunking protocol in a converged network.
4. Implement rapid spanning-tree in a converged network.
5. Implement inter-VLAN routing between VLANs.
6. Design internetworks using switches.
7. Implement switch security measures for a converged network.
8. Install, administer, and secure wireless networking devices.

EVALUATION:

Assignments will be graded on a point system; total points possible will be announced at the start of each project. Quizzes and tests will also be on a point system. Total points earned will be divided by total points possible to get a percentage with grade conversion as follows:

90 - 100 A
80 - 89 B
70 - 79 C
60 - 69 D

There are no points given for work turned in late; therefore, it is essential to meet all deadlines.

COURSE MEETING TIMES and FINAL:

This is a hybrid course which meets for hands-on labs 10-12 Thursdays in HB3. The final for this course is scheduled for **Friday, December 13, from 10-12 in HB3 and HB4**. The final two-hour block will include both the online test and a hands-on skills test.

INCOMPLETE POLICY:

There is no option for receiving an "incomplete" for a final grade in this course because the textbook and course content are online with frequent changes to course content, assignments, group projects, and labs. Please contact instructor for other options if you find yourself in a position that you cannot complete the work.

ACCOMMODATION:

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact instructor via email. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at www.umt.edu/dss/ or call 406-243-2243 (voice/text).

ACADEMIC INTEGRITY:

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/student_conduct.php

EXPECTATIONS/POLICIES:

1. Class structure will include lectures on new material, assignments, lab assignments, group discussions, research of current periodicals and Internet, review, handouts, and scheduled tests. Internet and e-mail is used extensively. Course curriculum (textbooks) and all tests are on-line.
2. Official UM email is mandatory for all correspondence between instructor and students. If you would to forward this email to a personal email, you can do that in Cyberbear. However, you must generate new messages from UMConnect account. This also applies to correspondence to admissions, the registrar, financial aid, and administration of Missoula College and UM.
3. As each project is assigned, total points possible, due date, and specific requirements will be posted in Moodle. Remember, no points are given for late submissions.
4. Interactive exercises and e-labs will be assigned with each chapter.
5. All grades will be on the Cisco Academy site.

CHANGES TO SYLLABI

Note: Instructor reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances. If changes are made to the syllabus, amended copies will be dated and made available to the class.

SYLLABUS UPDATED: August, 2013

COURSE OUTLINE:**I. Switching Concepts**

- A. Introduction to Ethernet/802.3 LANs
 - 1. Ethernet/802.3 LAN development
 - 2. Factors that impact network performance
 - 3. Elements of Ethernet/802.3 networks
 - 4. Half-duplex networks/Full-duplex
 - 5. Network congestion/latency/transmission time
- B. Introduction to LAN Switching
 - 1. LAN segmentation with routers
 - 2. LAN segmentation with switches
 - 3. Basic operations of a switch
 - 4. Switch latency
 - 5. Layer2 and Layer 3 switching
 - 6. Symmetric and asymmetric switching
 - 7. Memory buffering
 - 8. Switching methods
- C. Switch Operation
 - 1. Functions of Ethernet switches
 - 2. Frame transmission modes
 - 3. How switches learn addresses
 - 4. How switches filter frames
 - 5. Microsegmentation
 - 6. Collision domains
 - 7. Broadcast domains

II. Switches

- A. LAN Design
 - 1. LAN design goals and considerations
 - 2. Layer 1, 2, 3 design
- B. LAN Switches
 - 1. Switched LANs, access layer overview
 - 2. Access layer switches
 - 3. Distribution layer overview
 - 4. Distribution layer switches
 - 5. Core layer switches

III. Switch Configuration

- A. Starting the Switch
 - 1. Physical startup of the Catalyst switch
 - 2. Switch LED indicators
 - 3. Examining help in the switch CLI
 - 4. Switch command modes
- B. Configuring the Switch
 - 1. Verifying the Catalyst switch default configuration
 - 2. Configuring the Catalyst switch
 - 3. Managing the MAC address table

4. Configuring static MAC addresses
 5. Configuring port security
 6. Executing adds, moves, and changes
 7. Managing switch operating system file
 8. Password recovery
 9. Firmware upgrade
- IV. Spanning-Tree Protocol
- A. Redundant Topologies
 1. Redundant topologies
 2. Redundant switched topologies
 3. Broadcast storms
 4. Multiple frame transmissions
 5. Media access control database instability
 - B. Spanning-Tree Protocol
 1. Redundant topology and spanning tree
 2. Spanning-Tree protocol
 3. Spanning-Tree operation
 4. Selecting the root bridge
 5. Stages of spanning-tree port states
 6. Spanning-tree recalculation
 7. Rapid Spanning-Tree Protocol
- V. Virtual LANs
- A. VLAN Concepts
 1. VLAN introduction
 2. Broadcast domains with VLANs and routers
 3. VLAN operation
 4. Benefits of VLANs
 5. VLAN types
 - B. VLAN Configuration
 1. VLAN basics
 2. Geographic VLANs
 3. Configuring static VLANs
 4. Verifying, saving, and deleting VLAN configuration
 - C. Troubleshooting VLANs
 1. VLAN troubleshooting process
 2. Preventing broadcast storms
- VI. Virtual Trunking Protocol
- A. VTP
 1. VTP concepts
 2. VTP operation
 3. VTP implementation
 4. VTP configuration
 - B. Inter-VLAN Routing Overview
 1. Introducing inter-VLAN routing
 2. Physical and logical interfaces
 3. Dividing physical interfaces into subinterfaces

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- 4. Configuring inter-VLAN routing
 - VII. Access Control Lists
 - A. Access lists for packet filtering
 - B. Standard ACL
 - C. Extended ACL
 - D. Named ACL
 - E. Reflective ACL
 - F. Placement of ACLs
 - G. Logging