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ITS 152.01: CCNA 2 - Exploration - Routing Protocols and Concepts

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ITS 152, ROUTING PROTOCOLS and CONCEPTS

CREDITS: 3

Fall, 2013

August 26, 2013 - December 13, 2013

COURSE DESCRIPTION:

Covers router theory and technologies including configurations, IOS software management, routing protocol configuration, TCP/IP, and variable length subnetting.

REQUIRED TEXTBOOK:

CCNA Command Quick Reference, Cisco Press, 2013, ISBN: 978-1-58713-159-2

FACULTY: Penny Jakes, Associate Professor

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Phone: 406-243-7804

OFFICE HOURS:

Office hours are: 9-10 T, 12-1 W, 1-2 R 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. Hands-on labs and e-labs using simulation techniques are utilized.

PREREQUISITE: ITS 150

PERFORMANCE OUTCOMES:

At completion of course, students will be able to:

1. Configure various Cisco series routers to route traffic between LANs and WANs using CLI, setup mode, or backup copies.
2. Configure static routes, distance vector routing, and link-state routing protocols.
3. Examine routing tables for network connectivity, efficiency, and troubleshooting
4. Utilize VLSM and CIDR for efficient use of IP addressing space and security purposes.
5. Choose between, configure, and troubleshoot RIPv1, RIPv2, EIGRP, OSPF operations.
6. Select IOS versions for various capabilities and upgrade routers using TFTP server.
7. Troubleshoot hardware and configuration problems in a converged network.
8. Set up hardware and cabling to network PCs, routers, and switches for a converged network.

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**

FINAL: 30% on-line chapter quizzes
35% pop-quizzes, labs, lab tests, homework
20% on-line final
15% skills final

NOTE: Students must maintain a minimum grade of "C" in all classes that count toward major for the AAS degree.

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

FINAL:

The final for this course is scheduled for **Wednesday, December 11**, 1:10-3:10 p.m. in HB 3 and 4.

INCOMPLETE POLICY:

There is no option for receiving an "incomplete" for a final grade in this course because the course content, assignments, group projects, and labs change frequently. 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. Cisco Academy site will be used for learning management system, as well as Moodle.
3. Official UM email is mandatory for all correspondence between instructor and students. If you would like 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.

4. As each project is assigned, total points possible, due date, and specific requirements will be announced in class and posted on Moodle.
5. No points are given for late submissions.
6. Interactive exercises and e-labs will be assigned with each chapter.
7. All grades will be on the Cisco course management system.

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. WANs and Routers
 - A. WANs
 1. Router function in LANs
 2. Router function in WANs
 - B. Routers
 1. Router internal components and external connections
 2. Connecting console interfaces for management
 3. Connecting LAN interfaces
 4. Connecting WAN interfaces
- II. Introduction to Routers
 - A. Operating Cisco IOS Software
 1. The purpose of Cisco IOS software
 2. Router user interface modes
 3. Cisco IOS software features
 - B. Starting a Router
 1. Initial startup of Cisco routers
 2. Establishing a virtual terminal session
 3. Logging into the router
 4. Router command history
 5. Troubleshooting command line errors
 6. Show version command
- III. Configuring a Router
 - A. Configurations
 1. CLI command modes
 2. Router name
 3. Passwords
 4. Show commands
 5. Interfaces
 6. Adds, moves, and changes

- IV. Learning about other devices
 - A. Discovering and connecting to neighbors
 - 1. Information obtained with CDP
 - 2. Implementation, monitoring, and maintenance of CDP
 - 3. Creating a network map of the environment
 - 4. Disabling and troubleshooting CDP
 - B. Getting Information about Remote Devices
 - 1. Telnet
 - 2. Establishing, verifying, disconnecting, and suspending Telnet sessions
 - 3. Alternative connectivity tests
- V. Managing Cisco IOS Software
 - A. Router Boot sequence and verification
 - 1. Using the boot system command
 - 2. Configuration register
 - 3. Troubleshooting IOS boot failure
 - B. Managing the Cisco File System
 - 1. IOS file system overview and naming conventions
 - 2. Managing configuration files and IOS files using TFTP
- VI. Routing Protocols
 - A. RIP, RIPv2, RIPv6
 - B. EIGRP
 - C. OSPF
- VII. TCP/IP Error and Control Messages
 - A. Overview of TCP/IP Error Messages
 - 1. ICMP
 - 2. Error reporting and correction
 - 3. Unreachable networks
 - 4. PING, TRACERT, TELNET
 - B. Control Messages
 - 1. ICMP redirect/change requests
 - 2. Clock synchronization and transit time
 - 3. Requests and reply message formats
 - 4. Congestion and flow control messages
- VIII. Basic Router Troubleshooting
 - A. Routing table
 - 1. Gateway of last resort
 - 2. Route source and destination
 - 3. Layer 2 and 3 addresses
 - 4. Administrative distance
 - 5. Route metrics, next hop, last update
 - 6. Multiple paths to destination
 - B. Network Testing
 - 1. Structured approach
 - 2. OSI layers
 - 3. Debug

- IX. Intermediate TCP/IP
 - A. TCP Operation
 - 1. Synchronization
 - 2. Three-way handshake
 - 3. Denial of service attacks
 - 4. Windowing and window size
 - 5. Sequencing, positive ACK, and UDP
 - 6. Positive ACK
 - 7. UDP
 - B. Transport Layer
 - 1. Multiple conversations between hosts
 - 2. Ports for services and clients
 - 3. Ports for clients
 - 4. Port numbering and well-known port numbers
 - 5. MAC addresses, IP addresses, and port numbers
- X. Access Control Lists
 - A. Fundamentals
 - 1. ACLs types
 - 2. Creating ACLs
 - 3. Wildcard masks
 - B. ACLs
 - 1. Standard
 - 2. Extended
 - 3. Named
 - 4. Placing ACLs
 - 5. Firewalls