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CRT 151T.50: Networking Basics (On-Line)

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THE UNIVERSITY OF MONTANA—MISSOULA
COLLEGE OF TECHNOLOGY

COURSE NO: CRT 151T, Networking Basics (On-line)

FACULTY:
Penny Jakes penny.jakes@umontana.edu
Office phone: 406-243-7804; Home phone: 406-777-2625

OFFICE HOURS:
As posted on-line

Fall, 2006
September 5 - December 15, 2006

CREDITS: 3 (60 hours)
36 hours on-line portion
16 hours hands-on labs
　　to be arranged
　8 hours skills exam & proctored final
　　to be arranged

COURSE DESCRIPTION:

Introduction to the networking field including terminology; protocols; local-area and wide-area networks; the OSI model; topologies; IP addressing; cabling and cabling tools; routers and router programming; Ethernet and network standards; and wireless technologies.

ON-LINE IMPLEMENTATION:

Coursework (textbook) and all testing is done on-line in a multi-media format. Students need modern computer equipment capable of viewing text, html, audio, video, and flash animation. At completion of textbook material, students will complete hands-on lab portion on-campus; times to be announced. Options for completing the hands-on labs exist if student cannot attend on campus activities in Missoula. A proctored final is also required.

PREREQUISITE(S):

Demonstrated Computing Experience

PERFORMANCE OUTCOMES:

At completion of course, students will be able to:

1.   Compare and select appropriate internetworking devices to segment networks using the OSI model.

2.   Design IP addressing schemes using standard subnetting techniques.

3.   Choose a logical and physical LAN topology to solve networking problems.

4.   Evaluate networking media, connectors, wiring closets, structured cabling, and patch panels to meet networking requirements.

5.   Create, construct, and test a network using PC hardware and software, patch cables, installation of structured cabling, and digital test equipment.

6.   Prepare network documentation: engineering journal, spreadsheets, protocol inspection tools, cut sheets, topologies.

7.   Cooperate in engineering teams, engage in self and project management.

OPTIONAL TEXT:

CISCO: FIRST-YEAR COMPANION GUIDE, Vito Amato, Cisco Press, Revised Third Edition, 2005.
ISBN: 1-58713-150-1

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 GRADE: 15% on-line chapter quizzes
35% labs, lab tests, homework
20% on-line final
15% skills final
15% case study

ACCOMMODATION:

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please be prepared to provide a letter from your DSS Coordinator.

UM Coordinator: Daniel J. Burke
243-4424
www.umt.edu/dss/

STUDENT CONDUCT CODE:
Students are expected to follow the University of Montana Student Code. The code includes the following:

… Academic misconduct is defined as all forms of academic dishonesty, including but not limited to:
- Plagiarism**:** Representing another person's words, ideas, data or material as one's own.
- Substituting or arranging substitution, for another student during an examination or other academic exercise**.**
- Knowingly allowing others to offer one's work as their own.

Student Code copies are available at Student Services or
www.umt.edu/studentaffairs/

EXPECTATIONS/POLICIES:

1. On-line 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. As each project is assigned, total points possible, due date, and specific requirements will be announced. Refer to the On-Line course calendar.

3. Labs will be available for practicing concepts. At the end of the course, the hands-on labs will be scheduled.

4. Interactive exercises and e-labs will be assigned with each chapter.

5. All grades will be on the Cisco assessment web site and can be seen by students at the end of each project.

COURSE OUTLINE:

I. Introduction
- A. PC Hardware and Software
  1. Electronic components
  2. PC subsystems
  3. Backplane
  4. NIC
  5. Browsers/plug-ins
  6. Binary number system
  7. Troubleshooting
  8. Hexadecimal system
  9. MAC Addressing
- B. Journaling
- C. Networking
  1. Information flow
  2. Components
  3. Setup
  4. Industry standards
  5. LAN devices
     a. NICs
     b. Media
     c. Repeaters/hubs
     d. Bridges/switches
     e. Routers
     f. Clouds
     g. Network segments
  6. Topologies
  7. Segmentation
  8. WANs
  9. Network Design
  10. Collision Domains
  11. Broadcast Domains
- D. Digital Bandwidth
  1. Measurements
  2. Media bandwidth differences
  3. Throughput
  4. Data transfer calculation

II. OSI Model
- A. Encapsulation
- B. Physical Layer
- C. Data Link Layer
  1. MAC addresses
  2. Hexadecimal
  3. Frame format
  4. Topologies
  5. Media Access
  6. Troubleshooting
  7. IEEE 802.3/802.5/802.2
  8. Switches/bridges
- D. Network Layer
  1. Path determination
  2. Boolean operations
  3. Configuration
  4. Protocols
  5. ARP/RARP
  6. Segment with routers
  7. Datagrams
- E. Transport Layer
  1. Flow control
  2. Protocol stack
  3. Segment format
  4. TCP/UDP
  5. Ports/sockets
  6. Connection-oriented
  7. IGP vs. EGP
- F. Session Layer
- G. Presentation Layer
- H. Application Layer
- I. TCP/IP Layer comparisons
- J. Protocols

III. IP Addressing
- A. IP Classes
- B. ARP and RARP
- C. Subnet Masks
- D. Boolean Operations
- E. Creating Subnets
- F. Assigning Host Numbers
- G. Reserved space
- H. DHCP
- I. ARP/Proxy ARP
- J. Routed protocols
- K. Routing protocols
- L. Connectionless

IV. Media and Design
- A. Structured cabling
- B. Wiring closets
- C. HCC and VCC
- D. Security
- E. Safety
- F. Wiring plans/cut sheets
- G. Installation of cabling

V.   Topologies
     A.   Star
     B.   Extended Star
     C.   Bus
     D.   Token Ring

VI.   Cabling and Electronics
     A. Electricity basics
     B. Digital Multimeters
     C. Grounding
     D. Signaling
     E. Noise and interference
     F. Attenuation
     G. Cancellation
     H. Encoding
     I. Modulation
     J. CAT 5 cable/RJ45
       connectors
     K. Patch panels/punch down
     L. Testing/troubleshooting
     M. Collisions
     N. Wiring Closets

VIII.   Final
     A.   On-line
     B.   Oral/Written
     C.   Skills