

Course Outline

Fall 2005

Division: Information Technology

Program/Dept: Network Design and Administration

Course Number: NET 144 **Credits:** 5 **Variable:**

Course Title: Network Management - Cisco II

Inst. Intent: 21 Vocational Preparatory **CIP:** 11.0901

Fee: CL **Type:** Computer Lab Fee

Degree/Certificate Requirement: Yes

Name of Degree/

Certificate Requirements: Network Design and Administration Certificate/Cisco Alternative/AAS-T programs

Distribution Requirements for AA/AAS: Yes

Transfer Status to 4-year Institution: No

If Yes, Please Describe:

Course Length: Based on 11 wks/qtr **Class Size:** 24

Course Contact Hours: 55

Lecture: 55 **Lab:** **Clinical:** **Other:**

Prerequisite: Yes **If Yes, Please Describe:** NET 142

Required Placement Tests: No **If Yes, Please Describe:**

Comments:

Course Description:

This is the second of three quarter courses designed to provide students with classroom and laboratory experience in current and emerging networking technology that will empower them to enter employment and/or further education and training in the computer networking field. A task analysis of current industry standards and occupational analysis was used to develop the content standards. Instruction includes, but is not limited to, safety, networking, network protocols, LANs, WANs, Ethernet, LAN switching, Router IOS, TCP/IP Addressing, Router configuration, dynamic routing, static routing, and the network administrator's role and function. Particular emphasis is given to the use of decision-making and problem-solving techniques to solve networking problems.

Course Outcomes/Learning Objectives:

At the end of this quarter, the student will:

1. Examine router elements (RAM, ROM, CDP, show).
2. Describe connection-oriented network service and connectionless network service, and identify 3. key differences.
4. Define flow control and describe the three basic methods used in networking.
5. Identify the functions of the TCP/IP transport-layer protocols.
6. Manage configuration files from the privileged exec mode.
7. Identify the functions performed by ICMP.
8. Control router passwords, identification, and banner.
9. Identify the main Cisco IOS software commands for router startup.
10. Log in to a router in both user and privileged modes.
11. Use the context-sensitive help facility.
12. List the commands to load Cisco IOS software from: flash memory, a TFTP server, or ROM.
13. Prepare to backup, upgrade, and load a backup Cisco IOS software image.
14. Identify the parts in specific protocol address examples.
15. List problems that each routing type encounters when dealing with topology changes, and describe techniques to reduce the number of these problems.
16. Configure IP addresses.
17. Verify IP addresses.
18. Prepare the initial configuration of your router and enable IP.
19. Add the RIP routing protocol to your configuration.
20. Distinguish between cut-through and store-and-forward LAN switching.
21. Describe the operation of the Spanning Tree Protocol and its benefits.
22. Describe the benefits of virtual LANs.

SCCC General Education Outcomes and/or Related Instructional Outcomes (for technical courses) Met by Course: (list each outcome):

- Outcome 1. Think critically in reading and writing.
- A. Develop the attitudes that support problem solving and reasoning.
 - B. Apply thinking skills to diagnose hardware problems.
- Outcome 6. Work and communicate effectively in groups.
- A. Develop effective listening skills.
 - B. Develop effective speaking skills.
 - C. Develop skills to facilitate group work.

Topical Outline and/or Major Divisions:

Cisco Computer Networking

I. Networking

- A. Explain the concept of networking.
- B. Define protocols and their importance in networking
- C. Define LANs
- D. Define WANs
- E. Describe protocol data units and data encapsulation

II. Protocol Network Addressing

- A. Define and describe the purposes of other protocol network addressing.
- B. Demonstrate an understanding of routes.
- C. Define and describe the purpose and function of multi-protocol routing
- D. Describe and illustrate the process/function of reliability in routing IP addresses
- E. Demonstrate an understanding and the application of metric values to routing.

III. TCP/IP Network-Layer Addressing

- A. Demonstrate an understanding of TCP/IP network-layer addressing.
- B. Describe and illustrate a host address
- C. Define and describe the process used to identify an A, B, C, and D class
- D. Apply network protocols to an identified problem
- E. Demonstrate an understanding of dynamic routing.

IV. Distance Vectors

- A. Define and describe the function of distance vectors
- B. Demonstrate an understanding of the concept of time to convergence
- C. Define and describe the function of each of the following convergence processes:
 - 1. Counting to infinity
 - 2. Defining a maximum
 - 3. Split horizon
 - 4. Route poisoning
 - 5. Hold-down timers

V. Dynamic Routing—Link State

- A. Define and describe the function of a link state
- B. Define and describe the process of updating topology changes.
- C. Define, describe, and/or illustrate an understanding of link-state updates.

VI. Routing

- A. Demonstrate an understanding of the problems and solutions associated with LAN-to-LAN routing.
- B. Define, describe, and solve problems associated with LAN-to-WAN routing
- C. Demonstrate an understanding and be able to apply the various standards to the selection of external configuration sources.
- D. Identify, describe the functions, and determine the standard appropriate to selecting:
 - 1. Console terminal
 - 2. Modem through auxiliary port
 - 3. Virtual terminals
- E. Identify, describe the function, and determine the standard appropriate to making decisions about the following internal configuration components:
 - 1. RAM/DRAM
 - 2. NVRAM
 - 3. Flash
 - 4. ROM
 - 5. Interfaces
- F. Identify, describe the function, and determine the appropriate use of each of the following router modes:
 - 1. User EXEC mode
 - 2. Privileged EXEC mode
 - 3. SETUP mode
 - 4. Global configuration mode
 - 5. RXBOOT mode

VII. LAN Design

- A. Demonstrate an understanding of the processes used in the testing of a network.
- B. Demonstrate an understanding of LAN design by testing a network in the laboratory by:
 - 1. Applying the process for remote access to a router
 - 2. Applying the process to use CDP
 - 3. Apply the process to Telnet
- C. Define and describe the purpose and function of setup.

VIII. Router Configuration Files

- A. Define and describe router configuration files.
- B. Define and describe the use of a remote terminal console
- C. State or list the advantages and disadvantages of using a network TFTP server
- D. State or list the standards for NVRAM applications

IX. Configuration Commands

- A. Define and describe the process of configuring from a TFTP server.
- B. Identify and describe the process to configure from NVRAM
- C. Demonstrate an understanding of TFTP server control.
- D. Identify and describe the process of locating Cisco IOS™ software
- E. Describe the process for creating image software backup
- F. Describe the process upgrading the image from NET
- G. Demonstrate an understanding of Configuration commands by:
 1. Verifying IP addresses
 2. Completing an initial router configuration
 3. Using the IP routing protocol to create an internetwork with RIP and IGRP

Course Requirements (Expectations of Students)

1. Attending class sessions
2. Reading as indicated by instructor
3. Completing course assignments as indicated by instructor
4. Completing course exams

Methods of Assessment/Evaluation:

Graded on projects, lab performance, online and skill based exams

Required Text(s) and /or Materials:

Text: online curriculum

Additional text may be required at the instructor's discretion

Supplemental Text(s) and/or Materials:

At the instructor's discretion

Outline developed by: Wayne M Jarvimaki

Date: 10/99

Revised by: DC Shoemaker
Lisa Sandoval

Date: 12/09/99, 9/11/03, 10/23/03
8/03/05