

COURSE OUTLINE

Revision: Carol Koepke - Date: January, 2009

DEPARTMENT: Technical Education
CURRICULUM: Computing Technology
COURSE TITLE: Cisco III, Network Administration
COURSE NUMBER: CTN 284
TYPE OF COURSE: Vocational Preparatory
COURSE LENGTH: 1 Quarter
CREDIT HOURS: 5
LECTURE HOURS: 35
LAB HOURS: 20
CLASS SIZE: 20
PREREQUISITES: CTN 283 and pass Cisco's Semester II final exam

COURSE DESCRIPTION:

Semesters III and IV are taught concurrently in this quarter.

Semester III:

Instruction introduces switches, LAN's and VLAN's design, configuration and maintenance. Students develop practical experience in skills related to configuring LAN's, WAN's, Novell networks, IPX routing; IGRP protocols and network troubleshooting and Access Lists.

Semester IV:

Instruction introduces Wide Area Networks (WANs), Integrated Services Data Networks (ISDN) and Point-to-Point Protocols (PPP) and Frame Relay design, configuration and maintenance. Students develop skills related to configuring WAN's, ISDN, PPP and Frame Relay protocols and network troubleshooting through hands-on labs.

STUDENT LEARNING OUTCOMES ADDRESSED:

1. Technology Outcome: Demonstrate problem solving and network design by utilizing critical thinking skills.
2. Personal Responsibility: Demonstrate time management skills and independent work habits.
3. Critical Thinking: Demonstrate decision-making techniques by gathering and comparing data, selecting an appropriate action, and evaluating the decision made
4. Human Relations - Use social interactive skills to work in teams effectively
5. Information literacy - Access and evaluate information from a variety of sources and contexts

PROGRAM OUTCOMES ADDRESSED:

- 1c Identify network devices and operating systems combinations.
- 2a Install and properly configure network devices and related operating systems.
- 3a Select, implement appropriate troubleshooting tools and methods for problem solving.
- 3e Setup, configure, insert, and provide basic security and traffic control Cisco routers and switches.
- 3f Be able to secure and monitor activities on computers and networks.
- 4a Use critical thinking for analysis of hardware, OS, or network problems.
- 4b Access information efficiently and accurately to resolve computer problems.
- 4c Work effectively with others to accomplish complex tasks.

GENERAL COURSE OBJECTIVES:

At the end of the course the student will:

1. Be prepared to take the CCNA Cisco Exam.
2. Be able to demonstrate simple network design.
3. Understand the purpose, main functions and protocols used for Cisco switches and routers.
4. Be able to install setup and configure a router with several protocols and access lists.
5. Be able to install setup and configure a switch and VLANs.
6. Be able to explain switch and router protocols with respect to the OSI model and its 7 layers.
7. Technology Outcome: Demonstrate problem solving of networks failures and routers, and switches by utilizing critical thinking skills.
8. Technology outcome: Demonstrate methods of documentation required for Cut Sheets, LAN design, and incident reporting.
9. Personal Responsibility: Demonstrate time management skills and independent work habits.

GENERAL COURSE OBJECTIVES (Cont.):

10. Demonstrate decision-making techniques by gathering and comparing data, selecting an appropriate action, and evaluating the decision made.

TOPICAL OUTLINE:

APPROX. HOURS

SEMESTER 3

- I. Review of the OSI Model:
 - a. LAN Switching; Segmented LANs (with bridges, routers, LAN switches)
- II. LAN Switching: 1.0
 - a. Full duplex/ half duplex; Spanning Tree Protocol
- III. Virtual LANs 3.0
- IV. LAN Design /Network Design Developing a LAN Topology: 5.0
 - a. Layer 1 Media and Topology: Cable Plant Type; documentation – Logical Diagram
 - b. Layer 2 LAN Switching: Developing Layer 2 LAN Topology; Use Switches to Reduce Congestion; Switching; Migration to Higher Bandwidth
 - c. Layer 3 Routing: Routing Implementation / segmentation; Use Routers for Scalable Internetworks; Use Routers to Impose Logical Structure; File Servers and Traffic Patterns; Documenting Your Network
- V. IGRP protocol: 2.0
 - a. Representing Distance with Metrics; Interior and Exterior Routing Protocols; Dynamic Routing
- VI. Access Control Lists: TCP/IP Access Lists 6.0
- VII. Novell IPX routing : 2.0
 - a. Cisco Routers in NetWare Networks; Novell NetWare Protocol Suite; Addressing Multiple Novell Encapsulations/Cisco Encapsulation Names; Troubleshooting IPX Routing/ Troubleshooting IPX SAP

SEMESTER 4

- VIII. WAN Technologies: 6.0
 - a. Data Link Layer: WAN Protocols; Interfacing WAN Service Providers; Subscriber to
 - b. Provider Interface (DCE/DTE);
 - c. Using WAN Services with Routers; Serial Line, HDLC, PPP encapsulation;
 - d. WAN Link and technology options; Dedicated, Lease Line ; Packet/Cell-Switched

TOPICAL OUTLINE (Cont.):

	APPROX HOURS
I. <u>Frame Relay:</u>	2.0
a. Frame Relay Access Devices; Service and Circuits; Connectivity Dial-on-Demand Routing	
II. <u>WAN Design:</u>	5.0
a. Network Load; Traffic-Intense Applications; Core-Layer, Distribution-Layer, Access-Layer functions; Traffic Patterns; Server Placement	
III. <u>Point-to-Point Protocol (PPP):</u>	5.0
a. PPP Elements; PPP Link Negotiation; PPP Authentication and its Protocol	
IV. <u>Integrated Services Digital Network (ISDN):</u>	5.0
a. ISDN Services - Basic Rate Interface (BRI);Standards; Components/ Reference Points; Access Options and Switch Types; Configuring ISDN / Tasks / BRI	
V. <u>Frame Relay:</u>	3.0
a. Frame Relay Data Link Connection Identifier (DLCI);Frame Format; Addressing; Operation – LMI; Inverse ARP; Mapping; Switching; Operation with Subinterfaces; Implementation without Subinterfaces	
VI. <u>Network Management</u>	3.0
VII. <u>Network+ Certification Review</u>	1.0
VIII. <u>CCNA Certification Review</u>	1.0
IX. <u>Threaded Case Study Project</u>	5.0
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