



CET 1610 - Router Technology

Course Justification

This course is the second in a series of four courses that together encompass the Cisco Certified Network Associate (CCNA) certification program. A CCNA is recognized in the computer networking and internetworking industry as one who is competent to install, configure and operate routed LAN, routed WAN and switched LAN and LANE networks. CCNA certification is the first level of professional certification in Cisco products and internetworking with the ultimate goal of Cisco Certified Internetworking Expert (CCIE) certification.

Upon completion of the four CCNA courses the student will be expected to take the official Cisco CCNA Certification Exam.



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Course Description - This is the second course of the four-course Cisco curriculum that will lead the student toward the goal of achieving professional certification as a Cisco Certified Network Analyst (CCNA). Instruction includes networking, network terminology and protocols, network standards, LANs, WANs, OSI models, Ethernet, Token Ring, Fiber Distributed Data Interface (FDDI), TCP/IP Addressing Protocol, dynamic routing, routing, and the network administrator's function. Students will successfully implement beginning router configurations, demonstrate an understanding of routed and routing protocols and the fundamentals of LAN switching. Pre/Co requisite: CET 1600. Laboratory fee. (3hr. lecture; 2hr lab)

Course Competencies

Competency 1: The student will demonstrate an understanding of Ethernet frames by:

- a. Describing a preamble.
- b. Identifying and locating the source and destination addresses.
- c. Describing the criteria used to judge the contents a packet.

Competency 2: The student will demonstrate an understanding of Ethernet reliability by:

- a. Identifying network standards applicable to reliability.
- b. Defining and describing the concept of reliability.
- c. Describing CSMA/CD applicability to reliability.

Competency 3: The student will demonstrate an understanding of previously learned concepts by:

- a. Defining and describing the various topologies.
- b. Defining and describing cabling systems.
- c. Defining and describing internetworking devices.



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Competency 4: The student will demonstrate an understanding of the relationship between addressing and routing by:

- a. Describing a static route.
- b. Describing a dynamic route.
- c. Describing the purpose of routed protocols.
- d. Defining the purpose and function of multi-protocol routing.

Competency 5: The student will demonstrate an understanding of dynamic routing by:

- a. Defining and describing the function of distance vectors.
- b. Defining and describing distance vector convergence.

Competency 6: The student will demonstrate an understanding of the concept of time to convergence by:

- a. Describing update topology changes.
- b. Describing routing loops.
- c. Defining and describing the function of the following convergence processes:
 - a. Counting to infinity.
 - b. Defining a maximum.
 - c. Split horizon.
 - d. Route poisoning.
 - e. Holddown timers.

Competency 7: The student will demonstrate an understanding of a link state by:

- a. Describing and conducting a network discovery.
- b. Describing the purpose of link-state packets.
- c. Defining the shortest path first application.
- d. Conducting an Open Shortest Path First (OSPF).



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Competency 8: The student will demonstrate an understanding of the problems and solutions associated with LAN-to-LAN routing by:

- a. Defining, describing, and solving problems associated with LAN-to-LAN routing.
- b. Defining, describing, and solving problems associated with LAN-to-WAN routing.
- c. Defining, describing, and solving problems associated with layer decapsulation.

Competency 9: The student will demonstrate an understanding and apply the various standards to the selection of external configuration sources by:

- a. Identifying, describing the functions of, and determining the standard appropriate to selecting:
 - a. Console terminal.
 - b. Modem through auxiliary port.
 - c. Virtual terminals.

Competency 10: The student will demonstrate an understanding and apply the various standards to the selection of internal configuration components by:

- a. Identifying, describing the functions of, and determining the standard appropriate to making decisions about the following internal configuration components:
 - a. RAM/DRAM.
 - b. NVRAM.
 - c. Flash.
 - d. ROM.
 - e. Interfaces.

Competency 11: The student will demonstrate an understanding of LAN design by:

- a. Describing the various processes used to determine when to test a network.



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Competency 11: (Continued)

- b. Describing and defining the various processes used to determine when to test.
- c. Design and conduct a test of the network layer using:
 - a. The appropriate PING command.
 - b. The appropriate TRACE command.
 - c. The appropriate IP route command.

Competency 12: The student will demonstrate an understanding of LAN design by:

- a. Applying the process for remote access to a router.
- b. Applying the process to use CDP.
- c. Analyzing the information gained from CDP.
- d. Applying the process to test each of the following layers:
 - a. Application.
 - b. Network.
 - c. Data link.
 - d. Physical.
- e. Describing and defending what did work and what did not work.
- f. Applying solutions as appropriate.

Competency 13: The student will demonstrate an understanding of router configuration files and commands by:

- a. Describing the use of a remote terminal console.
- b. Describing the advantages and disadvantages of using a network TFTP server.
- c. Describing the standards for NVRAM applications.
- d. Describing the process of configuring from NVRAM.
- e. Listing the sequence used in startup.
- f. Defining and describing the following processes:
 - a. User EXEC mode.
 - b. Global configuration mode.
 - c. IP routing protocol mode.
- d. Interface configure mode.



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Competency 13: (Continued)

- g. Applying privileged EXEC mode to manage configuration files.

Competency 14: The student will demonstrate an understanding of TCP/IP addresses by:

- a. Describing IP addressing including:
 - a. IP classes.
 - b. IP bit patterns.
 - c. IP host addresses with subnets.
 - d. IP addresses without standards.
- b. Describing the process for configuring IP addresses.
- c. Describing how to use the IP routing protocol to create an internetwork with RIP and IGRP.
- d. Applying previously learned concepts to configure IP addresses.