



CET 2615 - Advanced Router Technology

Course Justification

This course is the third 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 third 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, LAN segmentation, segmentation techniques, IP, and IPX addressing, Fast Ethernet, the Spanning Tree Protocol, virtual LANs, LAN switching and VLANs, advanced LAN and LAN switched design, Novell IPX, Network management techniques and threaded case studies. Prerequisites: CET1600, CET1610. Laboratory fee. (3hr. lecture; 2hr lab)

Course Competencies

Competency 1: The student will demonstrate an understanding of switches and switching technology by:

- a. Defining and applying RX (receive) and TX (transmit) method of transmission.
- b. Describing the use of Carrier Sense Multiple Access/Collision Detect (CSMA/CD).
- c. Describing the increased capabilities of applications when segmenting with LAN switches.
- d. Explaining the function of a switch in Propagation Delay (Latency).
- e. Describing the functions involved in analyzing bi-directional Traffic.
- f. Summarizing microsegmentation as it relates to Ethernet transmission times.
- g. Designing a plan that improves LAN performance and illustrates the processes LAN switches use to learn addresses; including illustrations of the following concepts in the plan:
 - a. Segmenting.
 - b. Segmenting steps.
 - c. Dynamic steps.



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Competency 2: The student will demonstrate an understanding of virtual circuits by:

- a. Creating a virtual circuit.

Competency 3: The student will demonstrate an understanding of segmentation using bridges by:

- a. Defining and describing the effect of bridges on OSI model level.
- b. Defining and describing the effect of bridges on the operation.
- c. Defining and describing the effect of bridges on the increased latency.

Competency 4: The student will demonstrate an understanding of virtual lan's (VLANs) by:

- a. Defining and explaining the functions and benefits of a VLAN.
- b. Describing the use of switches in VLANs.
- c. Reorganizing user locations in VLANs and explaining the process used.
- d. Describing the advantages of using a VLAN.
- e. Setting up a VLAN, summarizing the process used, and paraphrasing the benefits.
- f. Explaining the benefits and operation of Broadcast Domains in VLANs.
- g. Summarizing the IEEE 802 VLAN Standards.
- h. Defining and describing the process used to lower the number of broadcast storms.
- i. Describing the processes used to transport VLANs across backbones.

Competency 5: The student will demonstrate an understanding of local area network design by:

- a. Defining and explaining the design goals of scalability, adaptability, and manageability.



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Competency 5: (Continued)

- b. Designing a Local Area Network and justifying and/or documenting the decisions made about each of the following design characteristics:
 - a. The design methodology.
 - b. Analyzing and documenting requirements.
 - c. Identifying and justifying decisions concerning business issues.
 - d. Identifying and justifying decisions concerning technology issues.
 - e. Identifying and justifying decisions concerning administrative issues.
 - f. Developing a LAN using both a Star and Extended Star topology.
 - g. Documenting the IP Addressing Scheme.
- c. Describe and document the criteria used to address speed and expansion.
- d. Documenting the purpose and source of the devices chosen for Layer Three, in particular; specify and justify routers used.

Competency 6: The student will demonstrate an understanding of Internet Gateway Routing Protocol (IGRP) by:

- a. Defining and explaining the path determination in the Network Layer.
- b. Describing and identifying the differences in router function and network layer function.
- c. Comparing and contrasting network addresses and host addresses in Network Layer addressing.
- d. Configuring IGRP Protocols using global tasks and interface tasks.
- e. Demonstrating IGRP configuration tasks.
- f. Defining and conducting a dynamic routing operation and identifying and documenting the resultant metrics changes.



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Competency 6: (Continued)

- g. Defining and explaining the purpose and operational characteristics of the following: autonomous system, internal/external routing protocol and IGRP.

Competency 7: The student will demonstrate an understanding of Access Control Lists (ACLs) by:

- a. Defining and describing the purpose and operation of standard ACLs and extended ACLs.
- b. Creating a list of deny/permit tests and explaining the difference.
- c. Defining and explaining the function and operation of Wildcard masks bits.
- d. Creating an ACL that illustrates configuration commands, global statements, and interface commands.

Competency 8: The student will demonstrate an understanding of Novell IPX by:

- a. Explaining the features of Cisco routers used in a Novell Network
- b. Discussing the difference between Novell IPX and other network protocols.
- c. Comparing the features of Novell NetWare with other network operating systems.
- d. Configuring a Novell Network using Novell IPX addresses, Network Number, and Network Node.
- e. Explaining the process of determining IPX addresses.
- f. Illustrating the operation of distance vector routing protocols.
- g. Defining and describing the purpose and the dynamic of SAP Broadcast.
- h. Naming, defining and summarizing Cisco encapsulation names.
- i. Conducting a Novell RIP routing.