

EE 344: Networking I

Designation: Elective

Catalog Description: Covers 4 semesters of the Cisco Networking Academy curriculum plus supplementary material; hands-on experience with routers and switches; prepares student for the CCNA. Topics include: TCP/IP, LANs, WANs, routing protocols, network security, PPP, ISDN, frame relay.

Credits: 4

Pre- and Co-requisites: EE 160 Programming for Engineers

Class/Lab Schedule: 3 lecture hours and one 3 hour lab/week

Topics Covered:

- Principles of internetworking, OSI Reference Model. Physical, Data Link, Network, Transport, Session, Presentation and Application layer functions (6 hours)
- Local Area Networks: Ethernet, Fastethernet and Gigabit Ethernet, token ring and FDDI technologies. Layer 2 devices including hubs, switches. Layer 2 protocols: CSMA/CD, token ring (10 hours)
- Interconnecting Networks with TCP/IP: Transport and Internet layer protocols, IP addressing, subnetting, variable length subnet masks (6 hours)
- Routers: routing protocols including Routing Information Protocol (RIP), Interior Gateway Routing Protocol (IGRP), Open Shortest Path First (OSPF), Bellman-Ford, Dijkstra. Router Operating System (Internetwork Operating System), router commands to configure, monitor and troubleshoot a network, Command Line Interface (10 hours)
- Switches: LANs and Virtual LANs, spanning tree protocol, operating system commands to configure, monitor and troubleshoot switched networks, LAN Design (6 hours)
- Network Security with Access Control Lists (3 hours)
- Novell SPX/IPX (2 hours)
- Wide Area Networks (WANs): PPP, ISDN, Frame Relay, WAN Design, and Network Management (8 hours)

Textbook and Other Required Materials:

Cisco Networking Academy Program online curriculum and supplementary text “Computer Networking: A Top Down Approach Featuring the Internet, 2nd edition” by James Kurose and Keith Ross, Addison Wesley, 2003.

Course Objectives and Relationship to Program Objectives:

The student develops an understanding of the principles of computer networking. In addition, the student learns the many real-world protocols which are needed in the Internet. The student should develop a good grasp of how the Internet works. The student learns how to configure

routers and switches which are principal components of a network. [Program Objectives this course addresses: A, B, C and D.]

Course Outcomes and Their Relationship to Program Outcomes

The following are course outcomes and the subset of Program Outcomes (numbered 1-11 in square brackets “[]”). They address:

- Study of the Principles of Networking [1, 3, 9, 10]
- Study of specific real-world protocols [3, 5, 8, 11]
- Working in a group in the lab to set up a network and make it work [2, 4, 7]

Contribution of Course to Meeting the Professional Component

"Engineering topics: 100% "

Computer Usage:

In the lab, students work with routers and switches which are computers. The students often log onto the Cisco website to learn more details about the Cisco routers and switches and how to troubleshoot the equipment when it is not functioning as expected. The students use simulation tools to practice configuration commands. The students take online exams.

Design Credits and Features:

The course has 1.5 design credits. Throughout the course, design issues are discussed whenever a new protocol is introduced. The tradeoffs that were used in their design is discussed extensively. The lecture material is reinforced in the lab where the students can see how some protocols work better than others.

Instructor(s): James R. Yee

Person(s) Preparing Syllabus and Date: James R. Yee , February 28, 2003.