CIS 58.81A Course Outline as of Fall 2001

CATALOG INFORMATION

Dept and Nbr: CIS 58.81A Title: CISCO NETWORKING 1
Full Title: Cisco Networking 1
Last Reviewed: 1/28/2002

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	2.00	8	Lab Scheduled	35.00
		Contact DHR	1.50		Contact DHR	26.25
		Contact Total	5.50		Contact Total	96.25
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 166.25

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	CIS 84.81A

Catalog Description:
First semester of Cisco's Networking Academy curriculum. Topics include Basic networking, OSI model and TCP/IP protocol.

Prerequisites/Corequisites:
Course Completion of CIS 51.15 (or CIS 84.31B)

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: First semester of Cisco's Networking Academy curriculum. Topics include Basic networking, OSI model and TCP/IP protocol. (Grade Only)
Prerequisites/Corequisites: Course Completion of CIS 51.15 (or CIS 84.31B)
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Spring 2001	Inactive:	Spring 2011
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Certificate Applicable Course

COURSE CONTENT

Outcomes and Objectives:
The student will:
1. Identify and describe the functions of each of the seven layers of the OSI reference model.
2. Compare and contrast data link and network addresses and identify key differences between them.
3. Define and describe the function of a MAC address.
4. List the key internetworking functions of the OSI Network layer.
5. Identify at least three reasons why the industry uses a layered model.
6. Compare and contrast the two parts of network addressing then identify the parts in specific protocol address examples.
7. Distinguish the function of each layer of the ISO/OSI reference model.
8. Demonstrate the five conversion steps of data encapsulation
9. Distinguish between the different classes of IP addresses (and subnetting).
10. Analyze the functions of the TCP/IP network-layer protocols.

Topics and Scope:

1. Introduction to Networking
   a. basic concepts and terminology.
   b. OSI reference model
2. Defining Networking
   a. two or more connected computer systems define a network.
   b. wired and wireless
   c. LANs
   d. WANs
3. Origins of Networking/Brief history
4. Why Do We Use Networks?
   a. Increasing dependence on technology has increased the need for networked devices.
   b. People expect interoperability between electronic devices such as

TVs, VCRs, and stereos systems.
   c. Networked devices share hardware and software. This is more convenient and less expensive than standalone systems.
5. Networking Terminology
   a. Connection Media
   b. Client/Server Networks
      1) Print servers
      2) File servers
      3) Database servers
      4) Remote access servers (RAS)
      5) Web servers
   c. Peer-to-Peer
   d. LAN, WAN, and MAN
      1) Usually a LAN is local
      2) MAN is citywide
      3) WAN spans multiple geographic areas.
      4) CAN (Campus Area Network) is sometimes used to describe college networks
      5) The term FAN (Family Area Network) is a relatively new term describing a home with more than one computer networked together.
   e. NOS
   g. NIC
   h. Networking Hardware
   i. Networking Software
6. Understanding the OSI Model
   a. history
   b. layers: physical, data link, network, transport, session, presentation, application.
   c. Most vendors agreed to support OSI. This made it easier to implement a variety of networks.
7. Reasons for Layering
   a. Simplifies networking by dividing it into less complex components
   b. Enables programmers to specialize in a particular layer
   c. Provides modularity which allows upgrades to a specific layer to remain separate from the other layers
   d. Encourages interoperability by promoting balance between different networking models
   e. Allows for standardized interfaces to be produced by vendors
8. Data Encapsulation
   a. data encapsulation in terms of the OSI reference model.
   b. Five steps of data encapsulation.
      1) data conversion
      2) segmentation
      3) packet creation
      4) frame
      5) bit transmission
9. Layer Functions
   a. Physical
      1) Media and other physical characteristics of the hardware
      2) Encoding
      3) Signal transmission

4) Repeaters and hubs

b. Data Link
   1) The frame which is the final formatting of the data before it is sent
   2) Access to the media
   3) Flow control and error-free transmission
   4) MAC address which is burned into the NIC card; 12-digit hexadecimal number; aka physical address or hardware address
   5) sublayers:
      1. LLC sublayer
      2. MAC sublayer
   6) CSMA/CD which is the access method used on Ethernet networks
   7) Bridging and switching

c. Network
   1) Error handling
   2) Software address (aka logical address)
   3) Packets
   4) Best path selection
   5) Routing and routers
   6) Example network protocols: IP and IPX

d. Transport
   1) Point-to-point transmission
   2) Error-free delivery and flow control
   3) Segmentation for optimal packet size
   4) Windowing and acknowledgements (ACKS) (discussed later)
   5) Connection-oriented and connectionless transmission
   6) Example transport protocols: TCP, UDP, and SPX

e. Session
   1) Sets up the conversation; session setup and tear down
   2) Control of data exchange for example full or half-duplex
   3) Data synchronization
   4) Transmission interruption and recovery
   5) Example session protocols: SQL, RPC, X-Windows

f. Presentation
   1) Prepares data from the application layer for transmission
   2) Reformats incoming data
   3) Formatting, translation, compression, and decompression
   4) Encryption and decryption
   5) Example presentation components: BMP, WAV, EBCDIC, ASCII

g. Application
   1) Where communications originate
   2) Initiates the request for network services
   3) Provides services to applications
   4) End system
   5) User interface
   6) Example application layer programs: email, file transfer

10. Origins of TCP/IP
   a. The invention and evolution of the TCP/IP protocol - ARPAnet
   b. U.S. Government
   c. The DOD.
   d. named the Internet, considered public domain.

11. Overview of the TCP/IP Protocol Suite

a. Four layers: Application, Transport, Internetwork, and Network Interface. These layers correspond to the layers in the OSI reference model.
b. Request for Comments (RFCs)
c. Compare the TCP/IP protocol suite to the OSI networking reference model.
    1) Application layer
    2) Transport layer
    3) Internetwork layer
    4) Network Interface layer

12. Application Layer
a. The TCP/IP Application layer includes protocols for e-mail, remote logins, file transfers, Web browsing, network management, and name management.
    1) FTP: ” The File Transfer Protocol (FTP)
    2) TFTP: ” The Trivial File Transfer Protocol (TFTP).
    3) NFS: ” The Network File System (NFS)
    4) SMTP: ” The Simple Mail Transfer Protocol (SMTP)
    5) Telnet: ” A telnet client can use this terminal emulation protocol (telnet)
    6) rlogin: ” The remote login application (rlogin)
    7) SNMP: ” You can install the Simple Network Management Protocol (SNMP) on TCP/IP hosts, including routers and other devices that support TCP/IP.
    8) DNS: ” The Domain Name System (DNS).
    9) HTTP: ” The World Wide Web uses the Hypertext Transfer Protocol (HTTP).

13. Transport Layer
a. Transport layer functions
b. TCPs network overhead
c. TCP reliability and the four steps of three-way handshake
d. Ports
    1) port numbers for communications between hosts.
    2) Well-Known Port Numbers
e. TCP Three-way Handshake and its four steps

14. Internetwork Layer
a. IP
b. ICMP.
c. ARP.
d. RARP.

15. Troubleshooting
a. PING
b. Traceroute

16. Network Interface Layer
a. The TCP/IP Network Interface-OSI Data Link and Physical layers
b. No specific IP functions exist at this layer

17. IP Addressing
a. compared to MAC addresses
b. what it identifies

18. IP Classes A-E - what they are assigned to and address details

19. Subnet Addressing
a. Subnet Address

b. Broadcast Address
20. Subdividing IP Classes
a. Reasons
b. Subnet Masking
c. Learning to Subnet
e. Subnetting Formulas
f. CIDR - Classless Inter-Domain Routing (CIDR) notation method

Assignment:

1. Individual hands-on exercises to demonstrate each topic.
2. Reading approximately 50 pages weekly from the textbook.
3. Participate in class discussion topics.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Quizzes, Exams, Hands-on computer exercises	Problem solving 20 - 50%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

SET UP, MAINTAIN AND TROUBLESHOOT NETWORKS	Skill Demonstrations 20 - 50%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Matching items, Completion, PERFORMANCE EXAM(S)	Exams 20 - 50%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:

"CCNA Guide to Cisco Networking Fundamentals" by Kurt Hudson and Kelly Cannon - Course Technology 2000