SAN BERNARDINO VALLEY COLLEGE
CURRICULUM APPROVED: FA2000

I.   CATALOG DESCRIPTION:

    A.   Department Information:

Division:	Business and Economics
Department:	Management Information Systems
Course ID:	MIS 090
Course Title:	Networking Fundamentals Semester One (Cisco Networking Academy)
Units:	Three (3)
Lecture:	Two (2)
Laboratory:	Three (3)

        Advisory Recommendation: MATH 952, PREALGEBRA, and MIS 181A, INTRODUCTION TO WINDOWS 95

    B.   Course Description:

        This course is designed to provide students with classroom and laboratory experience in the fundamentals of current and emerging networking technology. Topics covered include network topology, cabling, electrical considerations, the OSI model, Internet protocol addressing, bridges, switches, hubs, and routers.

    C.   Schedule Description

        Provides classroom and laboratory instruction in current and emerging networking technology. Includes network topology, cabling, electrical considerations, the OSI model, Internet protocol addressing, bridges, switches, hubs, and routers.

II.   NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III.   EXPECTED OUTCOMES FOR STUDENTS: Upon successful completion of the course, the student should be able to do the following:

    A.   Summarize purposes, rules, and regulations relative to computer networking on CISCO CAI CD ROM DISK.
    B.   Identify networking industry standards.
    C.   Visually identify twisted pair, unshielded twisted pair, fiber optic cable, and coaxial cable.
    D.   Describe what a Network Interface Card or NIC card is, how it works, its purpose, where located, and physical description.
    E.   Solve problems dealing with subnets and subnet masking.
    F.   Describe electrical characteristics and differences in fiber optic, coaxial and UTP media.
    G.   Identify routers, their purpose, and how routers differ from bridges.
    H.   Demonstrate how to make punch down connections, how to make jumper and patch cables using category 5 wiring and connectors, how to use simple testers to test cables, and how to use professional network diagnostic devices.
    I.   Explain and list the classes of network addresses, set up nets and subnet addresses, list the OSI network model layers, explain what a collision domain is, and explain the concept of octets.
    J.   Create a preliminary LAN design survey, and work in a group to set up simple a computer network.

IV.   CONTENT

    A.   Orientation to Skill Program
        1.   Computer hardware basics
        2.   Computer software basics
        3.   The Binary number system
        4.   Basic networking terminology
        5.   Digital bandwidth
    B.   The OSI Model
        1.   Layers
        2.   The OSI Model
        3.   How the OSI Model compares with the TCP/IP Model
    C.   Local Area Networks (LANs)
        1.   Basic LAN devices
        2.   The evolution of network devices
        3.   The basics of data flow through LANs
    D.   Electronic and Signals
        1.   Electricity
        2.   Digital multimeter
        3.   Signals and noise in communication systems
        4.   The encoding of networking signals
    E.   Media Connections and Collisions
        1.   The most common media
        2.   Cable specifications and termination
        3.   The process of making and testing cable
        4.   Layer 1 components and devices
        5.   Collisions and collision domains in shared layer environments
        6.   The basic topologies used in networking
    F.   Layer 2 Concepts
        1.   LAN standards
        2.   Hexadecimal numbers
        3.   MAC addressing
        4.   Framing
        5.   Media Access Control (MAC)
    G.   Layer 2 Technology
        1.   The basics of token-ring
        2.   The basics of FDDI
        3.   The details of Ethernet and IEEE 802.3
        4.   Layer 2 devices
        5.   Effects of Layer 2 devices on data flow
        6.   Basic Ethernet 10Base-T troubleshooting
    H.   Design and Documentation
        1.   Basic network design and documentation
        2.   Wiring closet specifications
        3.   Identifying potential wiring closets
        4.   Selection practice
        5.   Horizontal and backbone cabling
        6.   Electricity and grounding
        7.   Cabling and grounding
        8.   A wiring plan for Ethernet star topology LAN
        9.   Multiple earth ground problems
        10.   Power line problems
        11.   Surge suppressors and UPS functions
    I.   Structured Cabling Project
        1.   Project planning
        2.   RJ-45 jack and outlet installation
        3.   The basics of cable installation
        4.   The installation of structured cable runs
        5.   Stringing, running, and mounting cable

        6.   The basics of wiring closets and patch panels
        7.   The range of equipment and testing structured cabling projects

J.   Layer 3 Routing and Addressing
        1.   Network layers
        2.   Path determination
        3.   The purpose and operation of IP addresses within the IP header
        4.   IP address classes
        5.   Reserved address space
        6.   The basics of sub netting
        7.   Creating a subnet

K.   Layer 3 Protocols
        1.   Layer 3 devices
        2.   Network-to-network communications
        3.   Advanced ARP concepts
        4.   Routable protocols
        5.   Routing protocols
        6.   Other network layer services
        7.   ARP tables
        8.   IGP and EGP
        9.   Protocol analyzer software

L.   Layer 4 The Transport Layer
        1.   The transport layer
        2.   TCP and UDP
        3.   TCP connection methods

M.   Layer 5 The Session Layer
        1.   The basics of the session layer

N.   Layer 6 The Presentation Layer
        1.   The basics of the presentation layer

O.   Layer 7 The Application Layer
        1.   The basics of the application layer
        2.   The domain name system
        3.   Network applications
        4.   Application layer examples

V.   METHODS OF INSTRUCTION:
      A.   Lecture
      B.   Demonstration
      C.   Multi-media
      D.   Computer Assisted Instruction
      E.   Class and Group Discussion of Significant Issues and Topics
      D.   Group Activities

VI.   TYPICAL ASSIGNMENTS:

      A.   Lecture:
          1.   Identify the basic computer network functions and terminology
      B.   Demonstration:
          1.   Demonstrate the different media included in the EIA/TIA 569 standards of backbone cabling
      C.   Multi-media Presentations
          1.   Review Chapter 2, multi-media presentations. Be prepared to discuss and describe the functions of each of the seven layers of the OSI reference model.
      D.   Computer Assisted Instruction:
          1.   Using the WWW, Identify the reasons why the industry uses a layered model.
      E.   Class and Group Discussion:
          1.   Describe connection-oriented network service and connectionless network service, and identify the key differences between them.
      F.   Group Activities:
          1.   Determine the IP and MAC header for a data packet as it travels through a router, given the known MAC and IP information indicated in Figure 4-7.

VII.   EVALUATION:

    A.   Methods of evaluation:
        1.   Problem Solving Exercises
            a.   Typical Exercise
                (1)   Configure the network settings required to connect your PC to a local area network and to gain access to the Internet
        2.   Skills Demonstration
            a.   Typical Demonstration
                (1)   Lisa overhears your conversation with Mark and asks your opinion about data encapsulation. She is confused about the layers in which encapsulation occurs. Explain the five steps of data encapsulation to her.
        3.   Objective Tests
            a.   Typical Question
                (1)   Information transmitted on a network is called a(n) _____.
                a. package   b. expresser
                c. data destination   d. data packet
                e. E-pack
        4.   Written Assignments
            a.   Typical Assignment
                (1)   List ten (10) reasons for using the OSI model. How can detailed knowledge of the model be valuable for a network-support technician?
        5.   Lab Activities
            a.   Typical Lab Activity
                (1)   Create a straight-through cable per the EIA/TIA 568B specifications shown in Figure 5-1; test the cable using a simple continuity tester.
        6.   Presentations
            a.   Typical Presentation
                (1)   Perform the troubleshooting steps required in order to check when there is a network problem and in what order.

    B.   Frequency of evaluation:
        1.   On-line chapter examinations as each exercise/lesson is completed; the software provides immediate feedback and review
        2.   On-line final exam for CCNA
        3.   Skill-based final exam
        4.   Group work evaluated a minimum of three times per week.

    C.   Typical exam questions
        1.   Your team is trying to determine whether to recommend surface-mounted telecommunications connectors or flush-mounted ones in the Americanus Corporation building. Jennifer, one of your partners, argues for surface mounting because the building is already up, and flush mounting would require going through the walls, which would be difficult. Lisa, your other partner, points out that the Americanus Corporation is very nicely decorated, and surface mounting would be unsightly. What are some of the factors in deciding between surface-mounted and flush-mounted connectors? The company's interior walls are drywall. What do you recommend? What are the steps to run cable and install the telecommunications connectors in this case?

        2.   OSI comparison with TCP/IP Protocol Stack. Fill out the charts based on your knowledge of the OSI model and TCO/IP models. List the 7 layers of the OSI model from the top to the bottom with the proper name for each layer. List the TCP/IP layer number and its correct name in the next column. Also list the term used for the encapsulation units, the related TCP/IP protocols/utilities and the devices that operate at each layer. NOTE: More than one OSI layer will be related to certain TCP/IP layers.

VII.	TYPICAL TEXT(S)

    A.	Students will be working using the On-Line Cisco Academy Curriculum

    B.	Hudson, Kurt and Kelly, Caudle, *CCNA Guide to Cisco Routing,* Cambridge, MA: Course Technology, Thompson Learning

    C.	Hudson, Kurt and Kelly, Caudle, *CCNA Guide to Cisco Networking Fundamentals,* Cambridge, MA: Course Technology, Thompson Learning

IX.	OTHER SUPPLIES REQUIRED OF STUDENTS: Zip disk