I. CATALOG DESCRIPTION:

INFO–1461
Cisco Networking Semester 1
Prerequisite: None

This course is the first of four courses designed to equip students with knowledge and skills that can be applied toward entry-level ICT careers. The course offers both online and classroom learning. It is designed for students with basic PC usage skills and offers a hands-on, career-oriented approach to learning networking that emphasizes practical experience. Students learn how to set up a PC, plan an install a Small Office/Home Office network, troubleshoot network connectivity, share network resources, implement security and configure Internet applications and IP services.

Offered spring semester.

(3/45/0/0/0/V)

II. COURSE OBJECTIVES/COMPETENCIES:

A. Upon completion of the Networking for Home and Small Businesses course, students will be able to perform the following tasks:

1. Set up a personal computer system, including the operating system, interface cards, and peripheral devices
2. Plan and install a home or small business network and connect it to the Internet
3. Verify and troubleshoot network and Internet connectivity
4. Share resources such as files and printers among multiple computers
5. Recognize and mitigate security threats to a home network
6. Configure and verify common Internet applications
7. Configure basic IP services through a GUI

III. INSTRUCTIONAL MATERIALS

A. Web based on-line curriculum from the Cisco Networking Academy web site.

IV. COURSE OUTLINE:

A. Personal Computer Hardware
B. Operating Systems
C. Connecting to the Network
D. Connecting to the Internet through an ISP
E. Network Addressing
F. Network Services
G. Wireless Technologies
H. Basic Security
I. Troubleshooting Your Network
J. Putting it all together

V. METHOD OF PRESENTATION:

A. World Wide Web Cisco on-line curriculum at cisco.netacad.net
B. Instructor-led classroom lecture
C. Instructor-led hands on activities using networking equipment
D. Use of Cisco Press textbooks

VI. METHOD OF EVALUATION:

A. Class attendance is mandatory with special circumstances taken into consideration and compensation made by the student to fulfill the necessary time requirements in accordance with the school philosophy on attendance.
B. Hands-on activities that use networking equipment within the Networking Academy classroom
C. Online assessments and exams
D. Assigned computer activities

VII. SPECIFIC UNIT OBJECTIVE(S):

A. Personal Computer Hardware

1. Personal Computers and Applications
   a) How and Where Computers Are Used
   b) Types of Computer Applications

2. Types of Computers
   a) Classes of Computers
   b) Servers, Desktops, and Workstations
   c) Portable Devices

3. Binary Representation of Data
   a) Representing Information Digitally
   b) Measuring Storage Capacity
   c) Measuring Speed, Resolution, and Frequency

4. Computer Components and Peripherals
   a) Computer Systems
   b) Motherboard, CPU, and RAM
   c) Adapter Cards
   d) Storage Devices
   e) Peripheral Devices
   f) Cases and Power Supplies

5. Computer System Components
   a) Safety and best Practices
   b) Installing Peripherals and Verifying Operation
B. Operating Systems

1. Choosing the Operating System
   a) Purpose of an Operating System
   b) Operating System Requirements
   c) Operating System Selection

2. Installing an Operating System
   a) OS Installation Methods
   b) Preparing of OS Installation
   c) Configuring a Computer for the Network
   d) Computer Naming
   e) Network Name and Address Planning

3. Maintaining an Operating System
   a) Why and When to Apply Patches
   b) Applying OS Patches
   c) Application Patches and Updates

C. Connecting to the Network

1. Introduction to Networking
   a) What Is a Network
   b) Benefits of Networking
   c) Basic Network Components
   d) Computer Roles in a Network
   e) Peer-to-Peer Networks
   f) Network Topologies

2. Principles of Communication
   a) Source, Channel, and Destination
b) Rules of Communication

c) Message Encoding

d) Message Formatting

e) Message Size

f) Message Timing

g) Message Patterns

3. Communicating on a Local Wired Network

a) Importance of Protocols

b) Standardization of Protocols

c) Physical Addressing

d) Ethernet Communication

e) Hierarchical Design of Ethernet Networks

f) Logical Addressing

g) Address, Distribution, and Core Layers and Devices

4. Building the Access Layer of an Ethernet Network

a) Access Layer

b) Function of Hubs

c) Function of Switches

d) Broadcast Messaging

e) MAC and IP Addresses

f) Address Resolution Protocol (ARP)

5. Building the Distribution Layer

a) Distribution Layer

b) Function of Routers

   c) Default Gateway
d) Tables Maintained by Routers

e) Local-Area Network (LAN)

f) Adding Hosts to Local and Remote Networks

6. Plan and Connect a Local Network

a) Plan and Document an Ethernet Network

b) Prototypes

c) Multi-function Device

d) Connecting the Linksys Router


e) Sharing Resources

D. Connecting to the Internet through an ISP

1. The Internet and how we connect to it

a) Explain What the Internet Is

b) Internet Service Providers (ISP)

c) The ISP’s Relationship with the Internet

d) Options for Connecting to the ISP

e) ISP Levels of Service

2. Sending Information across the Internet

a) Importance of the Internet Protocol (IP)

b) How ISPs Handle Packets

c) Forwarding Packets across the Internet

3. Networking Devices in a NOC

a) Internet Cloud

b) Devices in Internet Cloud

c) Physical and Environmental Requirements

4. Cables and Connectors
a) Common Network Cables
b) Twisted-Pair Cables
c) Coaxial Cable
d) Fiber-Optic Cables

5. Working with Twisted Pair
   a) Cabling Standards
   b) UTP Cables
   c) UTP Cable Termination
   d) Cable Testing
   e) Cabling Best Practices

E. Networking Addressing

1. IP Addresses and Subnet Masks
   a) Purpose of an IP Address
   b) IP Address Structure
   c) Parts of an IP Address
   d) How IP Addresses and Subnet Masks Interact

2. Types if IP Addresses
   a) IP Address Classes and Default Subnet Masks
   b) Public and Private IP Addresses
   c) Unicast, Broadcast, and Multicast Addresses

3. How IP Addresses are obtained
   a) Static and Dynamic Address Assignment
   b) DHCP Servers
   c) Configuring DHCP

4. Address Management
a) Network Boundaries and Address Space
b) Address Assignment
c) Network Address Translation

F. Network Services

1. Clients/Servers and Their Interactions
   a) Client/Server Relationship
   b) Role of Protocols in Client/Server Communication
   c) TCP and UDP Transport Protocols
   d) TCP/IP Port Numbers

2. Application Protocols and Services
   a) Domain Name Service
   b) Web Clients and Servers
   c) FTP Clients and Servers
   d) IM Clients and Servers
   e) Voice Clients and Servers
   f) Port Numbers

3. Layered Model and Protocols
   a) Protocol Interaction
   b) Protocol Operation of Sending and Receiving a Message
   c) Open System Interconnection Model

G. Wireless Technologies

1. Wireless Technology
   a) Wireless Technology and Devices
   b) Benefits and Limitations of Wireless Technology
   c) Types of Wireless Networks and Their Boundaries
2. Wireless LANs
   a) Wireless LAN Standards
   b) Wireless LAN Components
   c) WLANs and the SSID
   d) Wireless Channels
   e) Configuring the Access Point
   f) Configuring the Wireless Client

3. Security Considerations on a Wireless LAN
   a) Why People Attack WLANs
   b) MAC Address Filtering
   c) Authentication on a WLAN
   d) Encryption on a WLAN
   e) Traffic Filtering on a WAN

4. Configuring an Integrated AP and Wireless Client
   a) Planning the WLAN
   b) Installing and Securing the AP
   c) Backing UP and Restoring Configuration Files
   d) Updating the Firmware

H. Basic Security

1. Networking Threats
   a) Risks of Networking Intrusion
   b) Sources of Network Intrusion
   c) Social Engineering and Phishing

2. Methods of Attack
   a) Viruses, Worms, and Trojan Horses
b) Denial of Service and Brute Force Attacks

c) Spyware, Tracking Cookies, Adware, and Pop-Ups

d) Spam

3. Security Policy

a) Common Security Measures

b) Updates and Patches

c) Anti-virus Software

d) Anti-spam

e) Anti-spyware

4. Using Firewalls

a) What Is a Firewall?

b) Using a Firewall

c) Vulnerability Analysis

d) Best Practices

I. Troubleshooting Your Network

1. Troubleshooting Process

a) Gathering Information

b) Approaches to Troubleshooting

2. Using Utilities to Troubleshoot Connectivity Issues

a) Detecting Physical Problems

b) Software Utilities for Troubleshooting Connectivity

3. Common Networking Issues

a) Connectivity Issues

b) LED Indicators

c) Wired Connectivity Problems
d) Connectivity Problems in a WLAN

e) DHCP Issues

f) Troubleshooting the Wireless Router to ISP Connection

4. Troubleshooting and the Help Desk

a) Documentation

b) Using Outside Sources of Help

c) Using the Help Desk

J. Putting It All Together

1. Summary Activity and Labs

VIII. ACADEMIC INTEGRITY:

Academic integrity forms a fundamental bond of trust between colleagues, peers, teachers, and students, and it underlies all genuine learning. At WNCC, there is no tolerance for plagiarism or academic dishonesty in any form, including unacknowledged "borrowing" of proprietary material, copying answers or papers, or passing off someone else’s work as one’s own.

A breach of ethics or act of dishonesty can result in:
- failure of a paper or exam within a course
- failure of an entire course (blatant plagiarism, cheating on a test or quiz)
- academic suspension or expulsion from the college

IX. EQUAL ACCESS:

Western Nebraska Community College is committed to providing equal access to educational opportunities through reasonable accommodation when necessary. If you qualify under the Americans with Disabilities Act (ADA), please notify the Director of Counseling (308 635-6090) as soon as possible to begin a process of documentation review and determination of appropriate accommodation or adaptive strategies.

9-10-09