NET 125
NETWORKING BASICS

COURSE DESCRIPTION:

Prerequisites: None
Corequisites: None

This course introduces the networking field. Emphasis is placed on network terminology and protocols, local-area networks, wide-area networks, OSI model, cabling, router programming, Ethernet, IP addressing, and network standards. Upon completion, students should be able to perform tasks related to networking mathematics, terminology, and models, media, Ethernet, subnetting, and TCP/IP Protocols. Course Hours Per Week: Class, 1. Lab, 4. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon successful completion of the course, students will be able to:

a. Explain the importance of data networks and the Internet in supporting business communications and everyday activities
b. Explain how communication works in data networks and the Internet
c. Recognize the devices and services that are used to support communications across an Internetwork
d. Use network protocol models to explain the layers of communications in data networks
e. Explain the role of protocols in data networks
f. Describe the importance of addressing and naming schemes at various layers of data networks
g. Describe the protocols and services provided by the application layer in the OSI and TCP/IP models and describe how this layer operates in various networks
h. Analyze the operations and features of transport layer protocols and services
i. Analyze the operations and feature of network layer protocols and services and explain the fundamental concepts of routing
j. Design, calculate, and apply subnet masks and addresses to fulfill given requirements
k. Describe the operation of protocols at the OSI data link layer and explain how they support communications
l. Explain the role of physical layer protocols and services in supporting communications across data networks
m. Explain fundamental Ethernet concepts such as media, services, and operation
n. Employ basic cabling and network designs to connect devices in accordance with stated objectives
o. Build a simple Ethernet network using routers and switches
p. Use command-line interface (CLI) commands to perform basic router and switch configuration and verification
q. Analyze the operations and features of common application layer protocols such as HTTP, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Simple Mail Transfer Protocol (SMTP), Telnet, and FTP
r. Utilize common network utilities to verify small network operations and analyze data traffic

OUTLINE OF INSTRUCTION:

I. Living in a Network-Centric World
   a. Communicating in a Network-Centric World
   b. Communication – An Essential Part of Our Lives
   c. The Network as a Platform
d. The Architecture of the Internet
e. Trends in Networking

II. Communicating Over the Network
a. The Platform for Communications
b. LANs, WANs, and Internetworks
c. Protocols
d. Using Layered Models
e. Network Addressing

III. Application Layer Functionality and Protocols
a. Applications – The Interface Between the Networks
b. Making Provisions for Applications and Services
c. Application Layer Protocols and Services Examples

IV. OSI Transport Layer
a. Roles of the Transport Layer
b. The TCP Protocol – Communicating with Reliability
c. Managing TCP Sessions
d. The UDP Protocol – Communicating with Low Overhead

V. OSI Network Layer
a. IPv4
b. Networks – Dividing Devices into Groups
c. Routing – How Our Data Packets are Handled
d. Routing Processes: How Routes are Learned

VI. Addressing the Network – IPv4
a. IPv4 Addresses
b. Addresses for Different Purposes
c. Assigning Addresses
d. Is It On My Network?
e. Calculating Addresses
f. Testing the Network Layer

VII. Data Link Layer
a. Data Link Layer – Accessing the Media
b. Media Access Control Techniques
c. Media Access Control Addressing and Framing Data

VIII. OSI Physical Layer
a. The Physical Layer – Communication Signals
b. Physical Signaling and Encoding: Representing
c. Physical Media – Connecting Communication

IX. Ethernet
a. Overview of Ethernet
b. Ethernet – Communication through the LAN
c. The Ethernet Frame
d. Ethernet Media Access Control
e. Ethernet Physical Layer
f. Hubs and Switches
g. Address Resolution Protocol (ARP)

X. Planning and Cabling Networks
   a. LANs – Making the Physical Connection
   b. Device Interconnections
   c. Developing an Addressing Scheme
   d. Calculating the Subnets
   e. Device Interconnections

XI. Configuring and Testing Your Network
   a. Configuring Cisco Devices – IOS Basics
   b. Applying a Basic Configuration Using Cisco IOS
   c. Verifying Connectivity
   d. Monitoring and Documenting Networks

REQUIRED TEXTBOOK AND MATERIALS:

Text to be assigned by the instructor each semester

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 919-536-7207, ext. 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1209.