COURSE DESCRIPTION:

Prerequisites: NET 125
Corequisites: None

This course introduces WAN theory and design, WAN technology, PPP, Frame Relay, ISDN, and additional case studies. Topics include network congestion problems, TCP/IP transport and network layer protocols, advanced routing and switching configuration, ISDN protocols, PPP encapsulation operations on a router. Upon completion, students should be able to provide solutions for network routing problems, identify ISDN protocols, and describe the Spanning Tree protocol. Course Hours Per Week: Class, 1. Lab, 4. Semester Hours Credit, 3.

LEARNING OUTCOMES:

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

a. Describe the impact of Voice Over IP or Video Over IP applications on networks
b. Identify and correct common network problems at layers 1, 2, 3, and 7 using a layered model approach
c. Interpret network diagrams
d. Describe the components required for network and Internet communications
e. Implement basic switch security measures such as port security, trunk access, and management VLANs
f. Explain the operation and benefits of DHCP and DNS
g. Configure, verify, and troubleshoot DHCP and DNS operations on a router
h. Describe current network security threats and explain how to implement a comprehensive security policy to mitigate common threats to network devices, hosts, and applications
i. Describe the functions of common security appliances and applications
j. Describe recommended security practices to secure network devices
k. Describe the purpose and types of access control lists (ACLs)
l. Configure and apply ACLs based on network filtering requirements
m. Verify, monitor, and troubleshoot ACLs in a network environment
n. Explain the basic operation of Network Address Translation (NAT)
o. Configure NAT for given network requirements
p. Troubleshoot NAT issues
q. Describe different methods for connecting to a WAN
r. Configure and verify a basic WAN serial connection
s. Configure and verify a Point-to-Point Protocol (PPP) connection between routers
t. Configure and verify Frame Relay connections
u. Troubleshoot WAN implementation issues
v. Describe the importance, benefits, role, impact, and components of VPN technology.

OUTLINE OF INSTRUCTION:

I. Introduction to WANs
   a. Providing Integrated Services to the Enterprise
   b. WAN Technology Concepts
   c. WAN Connection Options
II. PPP
   a. Serial Point-to-Point Links
   b. PPP Concepts
   c. Configuring PPP
   d. Configuring PPP with Authentication

III. Frame Relay
   a. Basic Frame Relay Concepts
   b. Configuring Frame Relay
   c. Advanced Frame Relay Concepts
   d. Configuring Advanced Frame Relay

IV. Network Security
   a. Introduction to Network Security
   b. Securing Routers
   c. Secure Router Network Services
   d. Secure Router Management

V. ACLs
   a. Using ACLs to Secure Networks
   b. Configuring Standard ACLs
   c. Configuring Extended ACLs
   d. Configuring Complex ACLs

VI. Teleworker Services
   a. Business Requirements for Teleworker Services
   b. Broadband Services
   c. VPN Technology

VII. IP Addressing Services
    a. DHCP
    b. Scaling Networks with NAT
    c. IPv6

VIII. Network Troubleshooting
     a. Establishing the Network Performance Baseline
     b. Troubleshooting Methodologies and Tools
     c. Common WAN Implementation Issues
     d. Network Troubleshooting

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.
Counsloors 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.