Miami Dade College

Course Description

CET1487C | Network + | 3.00 credits

This is an intermediate level course designed for students preparing for the hardware component of the Network+ certification. Students will learn how to install, configure, manage, troubleshoot and upgrade network devices including network interface cards, switches, hubs, wireless access points, routers, and patch panels. They will also learn about the construction, installation, testing and repair of the physical layer of the network, including wired cables, fiber optic media, wireless transmitters and antennas. Demonstrated knowledge of microcomputer fundamentals and system components is required. Recommended Preparation: CET1178C or A+ certification.

Course Competencies:

Competency 1: The student will demonstrate a basic understanding of computer network environments by:
1. Identifying basic networking concepts including how a network works
2. Explaining the use of binary numbers to represent instructions and data
3. Converting numbers among decimal, binary, and hexadecimal representation
4. Describing current network environments, such as peer-to-peer and client/server
5. Identifying the organizations and entities that promulgate network standards and protocols

Competency 2: The student will demonstrate an understanding of network topologies, data communications, and addressing methods by:
1. Describing logical and physical network topologies and identifying their appropriate implementations.
2. Identifying the seven layers of the OSI (Open Systems Interconnect) model, their functions, the devices at each layer, and their addressing schemes
3. Describing the main features of IEEE 802.2 (Logical Link Control), 802.3 (Ethernet), 802.5 (token ring), 802.11 (wireless), and FDDI (Fiber Distributed Data Interface) networking technologies
4. Identifying a MAC (Media Access Control) address and its parts
5. Identifying the components and structure of IP (Internet Protocol) addresses (IPv4, IPv6), their ranges, subnet masks, and the required settings for Internet connection
6. Describing the purpose of subnetting and performing subnet calculations using binary arithmetic

Competency 3: The student will demonstrate an understanding of network protocols and standards by:
1. Differentiating between the various network protocols in terms of routing, addressing schemes, interoperability, and naming conventions
2. Defining the purpose, function, and use of the protocols used in the TCP / IP protocol suite, including:
   a. TCP, UDP, FTP, SFTP, TFTP, SMTP, HTTP, HTTPS, POP3/IMAP4, Telnet, ICMP, and ARP
3. Defining the functions of TCP / UDP ports and identifying the well-known ports associated with the commonly used services and protocols
4. Identifying the purpose of network services and protocols such as DNS, NAT, ICS, WINS, SNMP, and NFS
5. Identifying the basic characteristics of WAN and Internet access technologies, such as leased-lines, DSL, Broadband Cable, ISDN, POTS / PSTN, Satellite and Wireless
6. Describing the function of remote access protocols and services, including RAS, PPP, SLIP, PPPoE, and VPN
7. Identifying security protocols and describing their purposes and functions, including IPSec, L2TP, SSL, WEP, and WPA
8. Identifying authentication protocols, such as CHAP, PAP, RADIUS, Kerberos, and EAP
9. demonstrate an understanding of the installation, configuration, and implementation of computers in a

network
10. Describing the basic capabilities needed for client workstations to connect to and use network resources
11. Selecting and using the appropriate tool for a given wiring task, such as wire crimper, media tester / certifier, punch down tool, and tone generator
12. Connecting a workstation to a remote network by configuring the protocols, authentication, network equipment, and physical connections
13. Discussing the characteristics and purposes of using firewalls, proxies, antivirus, and security software and implementing those services
14. Explaining the characteristics and purposes of VLANs, extranets, and intranets
15. Installing and configuring fault tolerant systems and preparing disaster recovery plans

Competency 4: The student will demonstrate an understanding of the planning, installation, testing, and troubleshooting of network cable infrastructure by:
1. Describing the characteristics of current cable standards, including speed, length, topology, and cable types
2. Assembling network media, connectors, terminators, patch panels, and utilizing appropriate installation tools
3. Constructing and interconnecting coaxial, UTP, fire optic cable, and supporting structures.
4. Installing and maintaining backbone and horizontal distribution systems.
5. Performing cable termination and splicing and fire prevention
6. Diagnosing, troubleshooting, and repairing network infrastructure using established procedures and testing methods

Competency 5: The student will demonstrate an understanding of the planning, installation, testing, and troubleshooting of a wireless network infrastructure by:
1. Describing the purposes, features and functions of wireless network components such as wireless Network Interface Card (NIC), bridges, routers, and Wireless Access Points (WAP)
2. Describing the characteristics (carrier speed, frequency, transmission type, topology) of wireless technologies, including 802.11, 802.11x, Infrared, and Bluetooth
3. Identifying the factors which affect the range and speed of wireless service, such as interference, antenna type, and environmental factors
4. Designing, installing, configuring, and securing a wireless network
5. Identifying and using the tools, basic diagnostic procedures, and troubleshooting methods for a wireless network

Competency 6: The student will demonstrate an understanding of providing network support by:
1. Selecting the appropriate network tools and utilities to perform troubleshooting
2. Interpreting the output from network diagnostic utilities to troubleshoot common network problems and determine their causes
3. Troubleshooting, diagnosing and repairing local and remote access network problems
4. Troubleshooting various connectivity problems between a client and a server
5. Optimizing, upgrading, and configuring network devices to improve performance

Competency 7: The student will demonstrate an understanding of network documentation and technical reference activities by:
1. Describing and using appropriate documentation, procedures, and practices
2. Producing and maintaining system documentation, configurations, specifications, and maintenance plans for network equipment
3. Maintaining visual network documentation, such as network plans, cabling diagrams, and flow charts
4. Performing network audits and analyses and producing service and maintenance reports

Learning Outcomes:
- Formulate strategies to locate, evaluate, and apply information

- Use computer and emerging technologies effectively