

addition, instruction and training are provided in the proper care, maintenance, and use of networking software, tools, and equipment.

Course Outcomes/Learning Objectives:

At the end of this quarter the student will:

1. Identify and describe the functions of each of the seven layers of the OSI reference model.
2. Describe data link and network addresses and identify key differences between them.
3. Define and describe the function of a MAC address.
4. List the key internetworking functions of the OSI Network layer.
5. Identify at least three reasons why the industry uses a layered model.
6. Describe the two parts of network addressing, then identify the parts in specific protocol address examples.
7. Identify the functions of each layer of the ISO/OSI reference model.
8. Define and explain the five conversion steps of data encapsulation.
9. Describe the different classes of IP addresses [and subnetting].
10. Identify the functions of the TCP/IP network-layer protocols.

SCCC General Education Outcomes and/or Related Instructional Outcomes (for technical courses) Met by Course: (list each outcome):

- Outcome 1. Think critically in reading and writing.
- A. Develop the attitudes that support problem solving and reasoning process.
 - B. To apply thinking skills.
- Outcome 6. Work and communicate effectively in groups.
- A. To demonstrate effective listening skills.
 - B. To demonstrate effective speaking skills.
 - C. To facilitate a group effectively.

Topical Outline and/or Major Divisions:

- I. **Networking**
 - A. Explain the concept of networking.
 - B. Demonstrate an understanding of the concept of an individual PC
 - C. Define protocol and its importance in networking
 - D. Define and describe network standards
- II. **OSI Model**
 - A. Demonstrate an understanding of the OSI model and the seven layers.
 - B. Identify and define the seven layers
- III. **Internetworking**
 - A. Name and identify internetworking devices
 - B. Define and describe segment
 - C. Describe how a repeater works
 - D. Identify and define collision domain
 - E. Identify and define bridge(s)
 - F. Identify and describe a backoff algorithm
 - G. Define and be able to discuss a broadcast storm
 - H. Define and demonstrate an understanding the concept of routers.
- IV. **IP Addressing**
 - A. Demonstrate an understanding of IP addressing schemes.
 - B. Define, describe, and write IP address(es)
- V. **IP Subnetting**
 - A. Demonstrate an understanding of subnetworks.
 - B. Define, describe, and write a subnetwork address using binary numbers
 - C. Define and describe a subnet mask

- VI. **Address Resolution Protocol (ARP)**
 - A. Describe an ARP request if the address is unknown
 - B. Describe and illustrate the process used during an ARP request
- VII. **Reverse Address Resolution Protocol (RARP)**
 - A. Describe and do an RARP request
 - B. Describe and illustrate an RARP request frame
- VIII. **Proxy ARP**
- IX. **Routing**
 - A. Demonstrate an understanding of how routers learn about networks.
 - B. Define and describe static routing
 - C. Define and describe dynamic routing
- X. **Routing Protocols**
 - A. Define, describe, and illustrate the use of:
 - 1. Routing Information Protocol (RIP)
 - 2. Interior Gateway Routing Protocol (IGRP)
 - B. Define, describe and use the process of proprietary routing protocols using: Hop, hop count, Link state, Distance vector, Stub networks and Default gateways
 - C. Define, describe and/or illustrate an understanding of routing between various subnetworks.
- XI. **Local-Area Networks (LANs)**

Demonstrate an understanding of the hardware needed to operate a LAN.
- XII. **Media**
 - A. Demonstrate an understanding of the importance, use, and selection factors of media.
 - B. Demonstrate an understanding of the problems and solutions associated with various types of media.
 - C. Define, describe, and apply solutions to EMI and RFI problems using cancellation and shielding.
 - D. Demonstrate an understanding of the factors involved in selecting the appropriate media.
- XIII. **Standards**

Demonstrate an understanding and be able to apply the various standards to the selection of media.

 - A. Institute of Electrical and Electronics Engineers (IEEE)
 - B. Underwriters Laboratory (UL)
 - C. Electrical Industries Association/Telecommunications Industries Association (EIA/TIA)
- XIV. **LAN Design**
 - A. Demonstrate an understanding of the processes used in the design and implementation of a LAN study.
 - B. Demonstrate an understanding of LAN design by designing a LAN in the laboratory
- XV. **Network Architecture :**
 - A. FDDI architecture
 - B. Token Ring architecture
 - C. Ethernet architecture
- XVI. **Topology**
 - A. Bus
 - B. Star
 - C. Extended star
 - D. Ring

XVII. Cabling

Demonstrate proper handling of UTP and STP cabling.

- A. Demonstrate an understanding of mounting cable.
- B. Demonstrate an understanding of the safety precautions to be taken when cabling.
- C. Demonstrate an understanding of the process for laying wires on a patch panel.
- D. Describe the process for testing cable.
- E. Demonstrate an understanding of the specifications and standards applicable to a wiring closet(s).
- F. Demonstrate an understanding of the process for determining efficient and effective network operation.
- G. Demonstrate an understanding of the connection made between network media and telecommunications outlets.

XVIII. Electrical Concepts and LANs

- A. Demonstrate an understanding of the connection between basic electrical concepts and wiring a LAN.
- B. Apply the understanding of electrical concepts and cable choices to the design of a safe wiring system in a LAN serving more than one building.
- C. Demonstrate an understanding of the process of data transmission.
- D. Analyze a network situation and select the appropriate media for the network.

Course Requirements (Expectations of Students)

1. Attending class sessions
2. Reading as indicated by instructor
3. Completing course assignments as indicated by instructor
4. Completing course exams

Methods of Assessment/Evaluation:

Graded on projects, lab performance, online and skill based exams.

Required Text(s) and/or Materials:

Text: online curriculum

Additional text may be required at the instructor's discretion

Supplemental Text(s) and/or Materials:

At the instructor's discretion

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