South Central College

COMP 1360  Introduction to Data Communications and Networking

Course Outcome Summary

Course Information

Description
Introduction to Data Communications and Networking is designed to provide students with the foundation-level skills they need to install, operate, manage, maintain, and troubleshoot a small business network. This course provides an introduction to the hardware, software, terminology, components, design, and connections of a network. It covers networking concepts such as the OSI model, topologies, and major protocols, in addition to the basic functions of system administration and operation. COMP 1360 is operating system independent and provides an introduction to several popular network operating systems. Through lectures, discussions, demonstrations, interactive learning tools, and hands-on labs, this course teaches the fundamental skills and concepts that are essential to any kind of networking career. It helps students prepare to take the Network+ certification exam. (Prerequisite: None)

Total Credits 4
Total Hours 64

Types of Instruction

Instruction Type Credits/Hours
Active Learning 4/64

Pre/Corequisites
None.

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Course Competencies

1. Describe the impact of computer networking on today’s society
   
   Learning Objectives
   
   Explain how networks impact daily life
   
   Describe the role of data networking in the human network
List the key components of a data network
List the opportunities and challenges posed by converged networks
List the main characteristics of common network architectures

2. **List the fundamental concepts of data communication**

   **Learning Objectives**
   Analyze the structure of a network
   List the components of a network
   Define the role of protocols in network communications
   List the advantages of using a layered network model
   Describe the role of each layer in the OSI and TCP/IP models
   Explain the addressing and naming schemes used in network communications

3. **Work with the application layer of the OSI model**

   **Learning Objectives**
   List the three top layers in the OSI model
   List the functions performed by the top three layers in the OSI model
   Describe how people use the application layer when communicating across the network
   Explain the functions of the well-known TCP/IP applications and their services
   Describe how protocols ensure compatibility between different network devices
   Analyze network traffic

4. **Work with the transport layer of the OSI model**

   **Learning Objectives**
   Describe the role of the OSI model's transport layer
   Explain the difference between TCP and UDP
   Describe how TCP and UDP function
   List appropriate uses of TCP and UDP

5. **Work with the network layer of the OSI model**

   **Learning Objectives**
   Explain how packets are routed from a device on one network to a device on a different network
   Describe how IP provides connectionless service
   Explain the difference between physical and logical networks
   Describe how routers use next-hop addresses to determine the path that packets need to take to reach their destinations
   Describe how routers forward data packets

6. **Explain the structure of IPv4 addresses**

   **Learning Objectives**
   Describe the IPv4 addressing structure
   Convert numeric values from binary, hexadecimal, or decimal to another numbering system
   Explain how network administrators assign network addresses
   Explain how ISPs assign network addresses
   Calculate the network portion of a host address
   Calculate the host portion of a host address
   Explain the role of the subnet mask in dividing networks
   Test networks to verify connectivity and operational status

7. **Work with the data link layer of the OSI model**

   **Learning Objectives**
   Describe the role of the data link layer protocols
   Explain how the data link layer prepares data for transmission
   Explain MAC and how it's methods function
   List the component parts of a Layer 2 frame and their roles

8. **Work with the physical layer of the OSI model**

   **Learning Objectives**
   List the physical layer protocols and their roles
Describe physical layer signaling and encoding
Explain how electrical signals can be used to represent data bits
List the basic characteristics of copper cable, fiber optic cable, and wireless network media

9. **Describe the characteristics and operation of Ethernet**

   **Learning Objectives**
   - Describe the evolution of Ethernet
   - Describe the Ethernet frame and the purposes of its fields
   - Explain how Ethernet makes use of the physical and data link layers
   - Explain the differences between an Ethernet hub and an Ethernet switch
   - Describe ARP and its operation

10. **Work with data communications network media**

    **Learning Objectives**
    - List the basic network media required to make a LAN connection
    - Describe the differences between intermediate and end-device connectivity in a LAN
    - List the pin-out configurations for straight-through and crossover cables

11. **Construct a simple Ethernet LAN**

    **Learning Objectives**
    - Construct a straight-through and a crossover cable
    - Design an addressing scheme for a network
    - Create a logical design of a simple Ethernet LAN
    - Create a physical design of a simple Ethernet LAN

12. **Explain the importance of information security**

    **Learning Objectives**
    - Define information security
    - Identify the challenges for information security
    - List important information security terms

13. **Describe information security attacks**

    **Learning Objectives**
    - Describe the four basic types of attacks
    - Create an attack and attacker profile
    - Identify denial of service attacks
    - Define malicious code

14. **Describe the basic principles of designing a secure system**

    **Learning Objectives**
    - Identify who is responsible for information security
    - List the five principles of information security
    - Explain the three pillars of information security

15. **Describe how to secure a simple Ethernet LAN**

    **Learning Objectives**
    - Disable non-essential systems
    - Harden operating systems and applications
    - Secure the network infrastructure
    - Secure removable media

16. **Explain how to protect internet-based services**

    **Learning Objectives**
    - List the main vulnerabilities of internet-based services
    - Implement security measures for electronic mail, web browsing, and instant messaging

17. **List the practical uses of cryptography**

    **Learning Objectives**
Define cryptography
Explain how to use cryptography
Describe the public key/private key system
Create a public key/private key set
Create a self-signed certificate

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