

IT 0105 - COMPUTER NETWORK FUNDAMENTALS

Catalog Description

Formerly known as CIS 65

Advisory: Completion of IT 100 with grade of "C" or better

Hours: 72 (54 lecture, 18 laboratory)

Description: Introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. Students achieve a basic understanding of how networks operate and how to build simple local area networks (LAN), perform basic configurations for routers and switches, implement Internet Protocol (IP) and enterprise technologies, including cloud and virtualization. Students will apply the knowledge and skills required to troubleshoot, configure, and manage common network devices; establish basic network connectivity; and implement network security, standards, and protocols. Preparation for the CompTIA Network+ certification exam. (C-ID ITIS 150) (CSU)

Course Student Learning Outcomes

- CSLO #1: Research, analyze and evaluate information to solve business problems using appropriate fundamental data networking technology.
- CSLO #2: Design and produce fundamental data networking solutions incorporating current trends, security, and best practices.
- CSLO #3: Employ fundamental data networking concepts and terminology in professional communication.
- CSLO #4: Demonstrate marketable fundamental data networking career skills.

Effective Term

Fall 2023

Course Type

Credit - Degree-applicable

Contact Hours

72

Outside of Class Hours

90

Total Student Learning Hours

162

Course Objectives

Lecture Objectives:

1. Describe and differentiate the devices and services used to support communications in data networks and the Internet.
2. Describe the role of protocol layers in data networks.
3. Evaluate the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments.
4. Explain how physical and data link layer protocols support the operation of Ethernet in a switched network.

5. Summarize DNS concepts and its components.
6. Identify virtual network components.
7. Identify common TCP and UDP default ports.
8. Explain how the upper layers of the OSI model support network applications.

Lab Objectives:

1. Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.
2. Configure switches and end devices to provide access to local and remote network resources.
3. Configure routers to enable end-to-end connectivity between remote devices.
3. Experiment with common network utilities to verify small network operations and analyze data traffic.
4. Create IPv4 and IPv6 addressing schemes and verify network connectivity between devices.
5. Configure a small network with security best practices.
6. Troubleshoot connectivity in a small network.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Objective Examinations
 - Example: Instructor will prepare multiple choice questions that are similar in content to the CompTIA certification exam for Network+. Students will take a practice certification exam and instructor shall evaluate the exam results and provide a pass/fail score. Example: What subnet mask can be used to segment the 172.16.0.0 network to allow for a minimum of 6 subnets while maximizing the number of hosts per subnet? a) 255.255.248.0 b) 255.255.224.0 c) 255.255.192.0 d) 255.255.128.0
- Projects
 - Example: Students will participate in a group project simulating a network design proposal for a fictitious business and present their results to the class. Instructor shall provide students with a rubric identifying grading criteria for the presentation.
- Skill Demonstrations
 - Example: Students are required to complete a variety of hands-on labs such as configuring an alternate IP address on client computer. Using techniques such as screen capture they can submit proof of completion to the instructor which can be reviewed for accuracy. Students will log into the NETLABS + environment and complete the skills simulation assigned. Students will submit appropriate documentation which will be reviewed by the instructor for accuracy and completeness.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Experiment with common network utilities to verify small network operations and analyze data traffic. After completing the reading and discussions of the topic the instructor will guide the students through the use of Wireshark Network Analyzer and demonstrate how captured data can be evaluated to see firsthand concepts previously discussed such as protocols, MAC addresses and packet segmentation. Students will then perform their own data captures and do a short write-up analyzing what they have captured.

Lecture:

1. Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks. Instructor will lead the class in a discussion on IP addressing schemes and how they can be used to enhance network performance and security. They will refer students to sites like LearnToSubnet.com to help extend the student's understanding and then provide an assignment that requires students to choose appropriate IP address ranges for a given scenario. By completing the assignment students will demonstrate that they understand how IP addresses should be used on internal systems and external facing systems and the difference between public and private address ranges.

Distance Learning

1. Following instructor lecture on TCP/IP, students will log into NETLAB + to complete a lab on TCP/IP configuration then submit the required result sheet.

Typical Out of Class Assignments

Reading Assignments

1. Students will be assigned reading from the chapter on IP addressing and then directed to additional resources to review on the Internet related to IPv4 and IPv6. They will then be expected to participate in a class discussion topic via Canvas and explain their viewpoints of the advantages of IPv6 vs IPv4. 2. Students will be assigned reading from the text on WANs and Remote Access methods and then participate in a classroom discussion of these topics led by the instructor.

Writing, Problem Solving or Performance

1. Students will be provided instructions on completing a hands-on lab using the NETLAB+ environment. 2. Following the reading and discussion of the chapter, students will do a written compare/contrast of various Networking Devices to show their level of comprehension.

Other (Term projects, research papers, portfolios, etc.)

At the end of the course students will be assigned to groups and work on a fictitious business network design project and present their plans to the entire class. They will be asked to prepare an overview of their plan and pricing sheets for the materials that will be needed.

Required Materials

- Network+ Guide to Networks
 - Author: Tamara Dean
 - Publisher: Cengage
 - Publication Date: 2019
 - Text Edition: 8th
 - Classic Textbook?:
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.