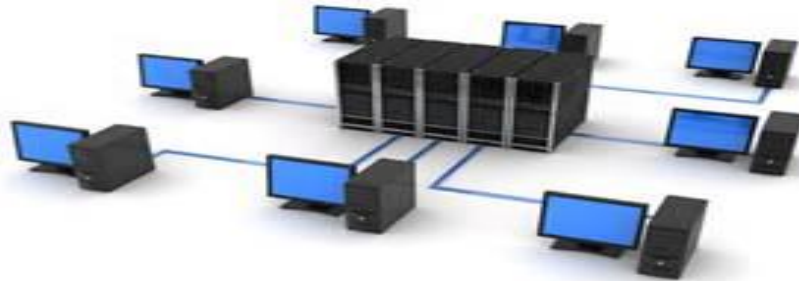


# NFC ACADEMY



## NETWORK SYSTEM DESIGN ACADEMIC INSTRUCTIONAL LIBRARY

### COURSE OVERVIEW

The Network System Design course will provide students with an understanding of computer networks and how they operate, as well as a basic understanding of how to manage and maintain computer networks. These skills will provide students with the ability to design, configure, and troubleshoot networks of all sizes.

Students will learn the basics of network design, including how to identify network requirements and determine the proper network architecture. They will be instructed on the requirements of network models, as well as be introduced to local area networks. Students will also learn about Internet Protocol and the basics of routing data on a network.

Students will be introduced to wide area networks and network security issues. In addition, students will learn about network management, including monitoring and troubleshooting. Last, students will learn about network operating systems and their role in connecting computers and facilitating communications.

### Objectives

- Understand computer networks and their functions, as well as know how to analyze business and technical goals of a network to effectively meet customer needs.
- Identify requirements to successfully support network users, applications, and devices. They will also understand network

architecture and topology, protocols, and services of local and wide area networks.

- Identify principles and operation of equipment like wire and circuits, as well as of standards such as open system interconnection, TCP/IP, and high-speed networking.
- Demonstrate knowledge of security requirements and data protection on a network, as well as the role of security tools such as routers, firewalls, and virtual private networks.
- Understand network operating systems and be able to support computer networks.

For topics in this course, it is helpful for students to be familiar with the basics of computer hardware (desktop and laptop), as well as desktop operating systems.

If students are not familiar with these topics, it is recommended, though not required, that they be introduced to computer hardware and desktop or workstation operating systems before starting this course. That includes examining hardware devices such as motherboards, hard drives, and processing chips and exploring the features and functions of a workstation operating system.

- **UNIT 1 - INTRODUCTION TO NETWORK DESIGN**
  - **Course Overview**
  - **Customer Needs and Goals**
  - **Project: Designing a Business Network – Complete this assignment Designing a Business Network.**
  - **Network Design: Network Infrastructure**
  - **Network Design: Physical and Functional Network Requirements**
  - **Quiz 1: Network Requirements**
  - **Network Architecture Components – Physical and Functional**
  - **Project: Connecting Physical to Function – Complete this assignment Connecting Physical to Function.**
  - **Logical Network Design – Addressing and Routing Protocols**
  - **Project: Exploring Higher Math**
  - **Network Architectural Models – Topologies and Classifications**
  - **Quiz 2: Network Architecture**
  - **Unit 1 Test**
  - **Course Project Part 1: Physical and Functional Requirements of a Network – Complete this assignment**

as a part of the Course Project for Network System Design.

- Glossary and Credits
  
- **UNIT 2 - NETWORKING MODELS AND LOCAL AREA NETWORKS**
  - The Network Reference Models
  - Project: Port Sniffing – Complete this assignment Port Sniffing.
  - The OSI Networking Model
  - The TCP/IP Networking Model
  - Quiz 1: TCP/IP and OSI Networking – The Fundamentals
  - LAN Fundamentals: Media, Topologies and Protocols
  - LAN Technologies: Ethernet
  - Wireless LANs and Security
  - Project: Playing With Wireless – Complete this assignment Playing With Wireless.
  - Quiz 2: Local Area Networks – Topologies, Transmission Media and Technologies
  - Unit 2 Test
  - Course Project Part 2: Local Area Network – Complete this assignment as a part of the Course Project for Network System Design.
  - Glossary and Credits
  
- **UNIT 3 - INTERNET PROTOCOL (IP): ADDRESSING AND ROUTING**
  - Addressing Fundamentals
  - IP Address: Classful Addressing
  - Project: IP Address Ranges and Subnetting – Complete this assignment IP Address Ranges and Subnetting.
  - Subnetting, Supernetting and Classless Addressing
  - Project: Researching Classless Inter-Domain Routing
  - Quiz 1: IP Addressing
  - Routing Basics
  - IP Routing Protocols: Distance Vector Routing
  - Project: Routing Tables – Complete this assignment Routing Tables.
  - IP Routing Protocols: Link State Routing
  - Project: Router Security – Complete this assignment Router Security
  - Quiz 2: IP Routing

- **Unit 3 Test**
  - **Course Project Part 3: Internet Protocol – Complete this assignment as a part of the Course Project for Network System Design.**
  - **Glossary and Credits**
- **UNIT 4 - WIDE AREA NETWORKS AND NETWORK SECURITY**
- **WAN Concepts**
  - **WAN Technologies**
  - **Project: Connecting to the Internet Backbone – Complete this assignment Connecting to the Internet Backbone.**
  - **WAN Configuration**
  - **Project: What Do All These Boxes Look Like?**
  - **Quiz 1: Wide Area Networks**
  - **Understanding Network Security**
  - **Project: Creating a Network Security Policy – Complete this assignment Creating a Network Security Policy.**
  - **Network Security Threats**
  - **Network Security Techniques**
  - **Project: Analyzing Network Security**
  - **Quiz 2: Network Security**
  - **Unit 4 Test**
  - **Course Project Part 4: Network Security – Complete this assignment as a part of the Course Project for Network System Design.**
  - **Glossary and Credits**
- **UNIT 5 - NETWORK MANAGEMENT AND NETWORK OPERATING SYSTEMS**
- **Network Management Design**
  - **Project: Designing a Network Management Plan**
  - **Network Management Architecture**
  - **Network Management Tools and Protocols**
  - **Project: Using Network Troubleshooting Tools – Complete this assignment Using Network Troubleshooting Tools**
  - **Quiz 1: Network Management Strategies and Design**
  - **Network Operating Systems**
  - **Project: Researching Network Operating Systems – Complete this assignment Researching Network Operating Systems.**
  - **The Windows Server**

- **The Linux Operating System**
  - **Project: Installing and Using Linux OS**
  - **Quiz 2: Network Operating Systems**
  - **Unit 5 Test**
  - **Course Project Part 5: Network Management Protocols – Complete this assignment as a part of the Course Project for Network System Design.**
  - **Glossary and Credits**
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- **UNIT 6 - COURSE REVIEW AND EXAM**
    - **Course Project Part 6: Network Administration - Complete this assignment as a part of the Course Project for Network System Design.**
    - Review
    - Exam