Network System Design	Scope and Sequence
Unit Lesson	**Objectives**
INTRODUCTION TO NETWORK DESIGN	
Customer Needs and Goals	
	Gather information to identify network stakeholders' needs and goals.
	Describe what makes a good survey question for network design research.
	Identify the purpose and parts of a good customer needs report.
Project: Designing a Business Network	
Network Design: Network Infrastructure	
	Identify the various aspects of network infrastructure.
	Explain how to create a network map.
	Describe and evaluate the various aspects involved in writing a network design requirement document.
Network Design: Physical and Functional Network Requirements	
	Evaluate physical network requirements.
	Identify functional network requirements.
	Define types of area networks.
Project: Office Planning	
Network Architecture Components – Physical and Functional	
	Explain what physical and functional network architecture components are.
	Describe the basics functions of power and computers.
	Summarize the physical and functional characteristics of network interface cards.
	Compare and contrast the physical and functional characteristics of switches and hubs.
	Compare and contrast the physical and functional characteristics of routers and firewalls.

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		Create a PowerPoint presentation that shows pictures of each of the components in a network.
	Project: Connecting Physical to Function	
	Logical Network Design – Addressing and Routing Protocols	
		Identify the details of IP address and routing.
		Explain the structure of binary and hexadecimal number systems.
		Discuss and provide examples of classful addresses and the seven layer OSI model.
	Project: Exploring Higher Math	
	Network Architectural Models – Topologies and Classifications	
		Describe geographic and host role-based networks.
		Describe management monitoring and security concerns involved in networks.
		Appraise five basic network topologies (bus, ring, star, tree, and mesh).
	Unit 1 Test	
NETWORKING MODELS AND LOCAL AREA NETWORKS		
	The Network Reference Models	
		Describe protocol history, including the significance of Jon Postel's contribution.
		Compare the TCP/IP model to the OSI Mode.
		Explain the benefits of layered architecture in prominent Internet protocols.
		Review network components of a typical network.
	Project: Port Sniffing	
	The OSI Networking Model	
		Understand the OSI model history.

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Unit	**Lesson**	**Objectives**
		Understand encapsulation in the OSI model.
		Compare the TCP and UDP protocols and explain the benefits of each.
	The TCP/IP Networking Model	
		Review the development and adoption of TCP/IP.
		Explain the differences between the OSI and TCP/IP models in depth.
		Analyze Encapsulation in the TCP/IP Model.
	Project: Researching TCP/IP	
	LAN Fundamentals: Media, Topologies and Protocols	
		Explain the evolution of modern networks as an analogy.
		Define Token Ring.
		Discuss the evolution of the Ethernet Protocols.
	LAN Technologies: Ethernet	
		Discuss the importance and give examples of the correct use of terms
		Describe the selection and use of a Token Ring or Ethernet figurations in business networking solutions.
		Compare Ethernet frames.
	Project: State Your Case, Argue For Each	
	Wireless LANs and Security	
		Demonstrate a working knowledge of wireless LANs.
		Explain the attributes of IEEE 802.11 a, b, g, and n and their basic differences.
		Analyze the use of wireless devices and security in wireless networking.
	Project: Playing With Wireless	
	Unit 2 Test	

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INTERNET PROTOCOL (IP): ADDRESSING AND ROUTING	
Addressing Fundamentals	
	Explain the fundamentals of IP addressing.
	Describe the routing components and function of an IP address.
	Explain the progression from IPv4 to IPv6 and how version 6 improves the efficiency of routing IP addresses.
IP Address: Classful Addressing	
	Define classful addresses, IP license classes.
	Describe the advantages of using CIDR.
	Explain the use of multicast addressing, broadcast addressing, and slash notation.
Project: IP Address Ranges and Subnetting	
Subnetting, Supernetting and Classless Addressing	
	Explain the functions and technical underpinnings of IP addressing.
	Demonstrate detailed functions of subnetting, supernetting and NAT routing.
Project: Researching Classless Inter-Domain Routing	
Routing Basics	
	Describe the evolution of devices and their functions.
	Detail routers and the IP address process including: subnets that address the network and host.
	Explain routing the protocols and basic routing functions.
IP Routing Protocols: Distance Vector Routing	
	Identify advanced routing protocols including vector and next link and explain their complexity.

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		Explain the role of metrics in route determination.
		Explain the importance of convergence.
		Describe Distance Vector Routing protocol.
	Project: Routing Tables	
	IP Routing Protocols: Link State Routing	
		Identify the basic concepts and advantages of link state routing protocols.
		Discuss the design and use of VLANs, switches, and routers in large and small networks.
	Project: Router Security	
	Unit 3 Test	
WIDE AREA NETWORKS AND NETWORK SECURITY		
	WAN Concepts	
		Explain network design from a broad perspective.
		Describe key players in developing the roots of the Internet.
	WAN Technologies	
		Describe the various factors involved in the creation the first fiber optical backbones.
		Describe how the backbone works today.
	Project: Connecting to the Internet Backbone	
	WAN Configuration	
		Discuss wide area networks from to the backbone to homes and offices.
		Describe the OSI-like model for fiber channel communications.
		Define the names of various devices functioning between the wall and routers when using ISDN and T1 connections.

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Unit	**Lesson**	**Objectives**
		Describe a CSU/DSU.
	Project: What Do All These Boxes Look Like?	
	Understanding Network Security	
		Explain computer and network security.
		Describe the goal and importance of network security.
		Identify network security strategies.
	Project: Creating a Network Security Policy	
	Network Security Threats	
		Describe security threats and their ramifications.
		Explain viruses and worms.
		Explain Trojan horses and other attacks.
	Network Security Techniques	
		Demonstrate knowledge of the roles that routers, firewalls, intrusion detection systems, and VPNs play in security.
		Understand VPN technology and its uses for securing remote access to networks.
		Understand how IPsec works and when it is used as an Internet security protocol.
		Understand SSL/TLS protocols and their implementation on the internet as mobile device protection.
		Describe the purpose of a network firewall and the different kinds of available firewall technology as web access protection.
		Understand the role of routers, switches, and other networking hardware in web network security.
	Project: Analyzing Network Security	
	Unit 4 Test	

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Unit	**Lesson**	**Objectives**
NETWORK MANAGEMENT AND NETWORK OPERATING SYSTEMS		
	Network Management Design	
		Explain why it is necessary to manage networks.
		Identify key elements and categories monitored in network management.
		Identify names and characteristics of network operating systems.
		Describe the tasks and tools that are necessary to manage network activity.
	Project: Designing a Network Management Plan	
	Network Management Architecture	
		Describe how network problems are diagnosed and repaired.
		Identify the tasks of system administration.
		Understand how to use the SNMP and other tools for network management.
	Network Management Tools and Protocols	
		Identify Task Categories for Network Management Tools.
		Discuss Troubleshooting Software.
		Describe Network Monitoring Tools.
	Project: Using Network Troubleshooting Tools	
	Network Operating Systems	
		Demonstrate the knowledge of the general characteristics of network operating systems
		Describe Network Operating System Functions.
		Identify Two Primary Network Configurations.
		Identify Five Types of Network Hardware.

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	Project: Researching Network Operating Systems	
	The Windows Server	
		Explain the possible issues with installing a Microsoft network operating system.
		Demonstrate knowledge of Microsoft Windows Server operating systems.
		Identify and explain the main capabilities (client support, interoperability, authentication, file and print services, application support, and security) for Windows servers.
		Identify the main capabilities (client connectivity, local security mechanism, and authentication) of client Windows workstations.
	The Linux Operating System	
		Demonstrate knowledge of the Linux operating system.
		Identify major capabilities for the Linux operating system.
		Identify major distributions of the Linux operating system.
	Project: Installing and Using Linux OS	
	Unit 5 Test	
COURSE REVIEW AND EXAM		
	Review	
	Exam	