

ITT Technical Institute
IT220P
Network Standards and Protocols
Onsite Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 66 (46 Theory Hours, 20 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisites: TB143P Introduction to Personal Computers, TB145P Introduction to Computing

Course Description:

This course serves as a foundation for students pursuing knowledge and skills in computer networking technologies. Major concepts such as OSI and TCP/IP models, network media specifications and functions, LAN/WAN protocols, topologies and capabilities will be discussed. Industry standards and a brief historical development of major networking technologies will be surveyed in conjunction with basic awareness of software and hardware components used in typical networking and internetworking environments.

Where Does This Course Belong?

This course is required for the associate program in Computer Network Systems and the associate program in Computer and Electronics Engineering Technology.

NOTE: *Refer to the catalog for the state-specific course and program information, if applicable.*

Course Summary

Major Instructional Areas

1. Hardware and Software Used in Data Networks
2. The OSI and TCP/IP Models and Their Applications
3. Classifications of Networks
4. Network Addressing (IPv4 and IPv6)
5. Physical and Logical Connectivity of Networks
6. Tools for Designing, Managing, and Troubleshooting Networks

Course Objectives

1. Identify the major needs and major stakeholders for computer networks and network applications.
2. Identify the classifications of networks and how they are applied to various types of enterprises.
3. Compare and contrast the OSI and TCP/IP models and their applications to actual networks.
4. Explain the functionality and use of typical network protocols.
5. Analyze network components and their primary functions in a typical data network from both logical and physical perspectives.
6. Differentiate among major types of LAN and WAN technologies and specifications and determine how each is used in a data network.
7. Explain basic security requirements for networks.
8. Install a network (wired or wireless), applying all necessary configurations to enable desired connectivity and controls.
9. Use network tools to monitor protocols and traffic characteristics.
10. Plan and design an IP network by applying subnetting skills.
11. Use preferred techniques and necessary tools to troubleshoot common network problems.
12. Assess a typical group of devices networked to another group of devices through the Internet, identifying and explaining all major components and their respective functions.

Detailed Topical Outline

1. Unit 1—Computer Structures Review
 - 1.1. Learning Outcomes
 - 1.1.1. Describe how digital devices store data.
 - 1.1.2. Describe the differences between input and output devices.

- 1.2. Reading
 - 1.2.1. Odom, Chapter 1: Introduction to Computer Data
 - 1.2.2. Richardson, Chapter 1
2. Unit 2—Computer Networks
 - 2.1. Learning Outcomes
 - 2.1.1. Define a computer network.
 - 2.1.2. Identify the primary needs for computer networks and network applications.
 - 2.1.3. Draw the four major physical network topologies: bus, star, ring, and mesh.
 - 2.2. Reading
 - 2.2.1. Odom, Chapter 2: Introduction to Computer Networking
 - 2.2.2. Richardson, Chapter 2
3. Unit 3—Networking Models
 - 3.1. Learning Outcomes
 - 3.1.1. Compare and contrast the OSI and TCP/IP models and their applications to actual networks.
 - 3.1.2. Differentiate between proprietary and nonproprietary protocols.
 - 3.1.3. Explain the use of IP addressing in data networks.
 - 3.2. Reading
 - 3.2.1. Odom, Chapter 3: TCP/IP Networks
 - 3.2.2. Richardson, Chapter 3
4. Unit 4—Physical and Data Link Layer Network Concepts
 - 4.1. Learning Outcomes
 - 4.1.1. Explain the fundamentals of electrical circuits.
 - 4.1.2. Identify different types of physical cabling.
 - 4.1.3. Identify wireless network communication needs.
 - 4.1.4. Distinguish among the different needs for wired and wireless networks.
 - 4.1.5. Classify Layer 2 networking components used in a typical LAN.
 - 4.1.6. Compare and contrast advantages and disadvantages of network media.
 - 4.1.7. Use basic troubleshooting techniques to ensure network connectivity at Layers 1 and 2.
 - 4.2. Reading
 - 4.2.1. Odom, Chapter 4: Transmitting Bits
 - 4.2.2. Richardson, Chapter 4
5. Unit 5—Ethernet Local Area Networks
 - 5.1. Learning Outcomes
 - 5.1.1. Define Ethernet LAN concepts.
 - 5.1.2. Evaluate the advantages and disadvantages of Ethernet technology in LANs.

- 5.1.3. Analyze the advantages of using Layer 2 devices to segment LANs.
- 5.1.4. Troubleshoot wired LANs for connectivity and performance.
- 5.2. Reading
 - 5.2.1. Odom, Chapter 5: Ethernet LANs
 - 5.2.2. Richardson, Chapter 5
- 6. Unit 6—Wireless Ethernet Local Area Networks
 - 6.1. Learning Outcomes
 - 6.1.1. Identify devices required in wireless networks.
 - 6.1.2. Differentiate between Layer 1 and Layer 2 concepts in wireless networks.
 - 6.1.3. Analyze wireless standards.
 - 6.1.4. Design a basic small business wireless Ethernet network.
 - 6.1.5. Troubleshoot wireless LANs for connectivity and performance.
 - 6.2. Reading
 - 6.2.1. Odom, Chapter 6: Wireless LANs
 - 6.2.2. Richardson, Chapter 6
- 7. Unit 7—Wide Area Networks
 - 7.1. Learning Outcomes
 - 7.1.1. Differentiate among WAN technologies available from service providers.
 - 7.1.2. Evaluate how WAN devices function.
 - 7.1.3. Define and describe WAN protocols.
 - 7.1.4. Evaluate troubleshooting techniques for WAN connections.
 - 7.2. Readings
 - 7.2.1. Odom, Chapter 7: Wide Area Networks
 - 7.2.2. Richardson, Chapter 7
- 8. Unit 8—Networking Protocols
 - 8.1. Learning Outcomes
 - 8.1.1. Explain the functionality of typical network protocols.
 - 8.1.2. Plan and design an IP network by applying subnetting skills.
 - 8.1.3. Categorize TCP/IP protocols according to network model layers.
 - 8.1.4. Describe how TCP/IP addressing moves data packets through networks.
 - 8.2. Reading
 - 8.2.1. Odom, Chapter 8: The Internet Protocol (IP)
 - 8.2.2. Richardson, Chapter 8
- 9. Unit 9—Internet Technologies
 - 9.1. Learning Outcomes
 - 9.1.1. Relate how different technologies are used to access the Internet.
 - 9.1.2. Define how IP routing is used in the Internet to move data from source to destination.

- 9.1.3. Define classless routing.
- 9.1.4. Evaluate the need for NAT, PAT, CIDR, and IPv6 in current networks.
- 9.2. Reading
 - 9.2.1. Odom, Chapter 9: The Internet
 - 9.2.2. Richardson, Chapter 9
- 10. Unit 10—Transporting Data through Networks
 - 10.1. Learning Outcomes
 - 10.1.1. Define how data logically moves through networks.
 - 10.1.2. Compare and contrast TCP and UDP transportation techniques.
 - 10.2. Reading
 - 10.2.1. Odom, Chapter 10: TCP/IP Transport
 - 10.2.2. Richardson, Chapter 10
- 11. Unit 11—Final Exam

Learning Materials and References

Required Resources

Complete Textbook Package	New to This Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Odom, W. (2013). <i>Introduction to networking</i> . Boston, MA: Pearson.	■		
Richardson, T. (2013). <i>Introduction to networking lab manual</i> . Boston, MA: Pearson.	■		
Other Items	New to This Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Software <ul style="list-style-type: none"> ▪ Prebuilt Virtual Machines, Windows and Linux ▪ Wild Packets OmniPeek Network Analyzer ▪ Wireshark Network Protocol Analyzer 	■		■
Equipment Needed <ul style="list-style-type: none"> ▪ Linksys Wireless E3000 WLS N (2) ▪ TRENDnet Wireless USB Adapter TEW424UB (30) 	■		■
Other <ul style="list-style-type: none"> ▪ Wireless network access 	■		■

Technology Requirements

Course-Specific Lab Setup

For the standard computer lab setup, refer to the requirements provided in the current Course Catalog. In addition to the standard lab setup, the following equipment is required (quantity in parenthesis):

- Linksys Wireless E3000 WLS N (2)
- TRENDnet Wireless USB Adapter TEW424UB (30)
- VMware Player, 4.0.1 or newer (1)
- Prebuilt Virtual Machines, Windows and Linux
- Wild Packets OmniPeek Network Analyzer
- Wireshark Network Protocol Analyzer

NOTE: Students will need access to the ITT Tech student wireless network. If a student does not have access already, he or she will need to work with the campus SST.

Recommended Resources

Books and Professional Journals

Books

- Comer, D. E. (2009). *Computer networks and internets. 5th ed.* Upper Saddle River, NJ: Prentice Hall.
- Dean, T. (2009). *Network+ guide to networks. 5th ed.* Boston, MA: Cengage Learning.
- Peterson, L. L. (2011). *Computer network: a systems approach. 5th ed.* Boston: Morgan Kaufmann.
- Roshan, P. (2009). *802.11 Wireless LAN fundamentals. 2nd ed.* Indianapolis, IN: Cisco Systems.
- Wong, K. D. (2011). *Fundamentals of wireless communications engineering technologies.* Hoboken, NJ: John Wiley & Sons.

Online Professional Journals

- InfoWorld: <http://www.infoworld.com/>
- NetworkWorld: <http://www.networkworld.com/>
- TechNet (sponsored by Microsoft): <http://technet.microsoft.com/en-us/>

Professional Associations

- American Registry of Internet Numbers: <https://www.arin.net/>
- American National Standards Institute: <http://www.ansi.org/>
- Institute of Electrical and Electronic Engineers: <http://www.ieee.org>
- International Organization for Standardization: <http://www.iso.org>
- Internet Assigned Numbers Authority: <http://www.iana.org/>
- Internet Engineering Task Force (IETF): <http://www.ietf.org/>
- IPv6 Forum: <http://www.ipv6forum.com/>
- National Institute of Standards and Technology (NIST): <http://www.nist.gov/index.html>
- Organization for the Advancement of Structured Information Standards (OASIS): <http://www.oasis-open.org/>
- Telecommunications Industry Association (TIA): <http://www.tiaonline.org/>

ITT Tech Virtual Library (accessed via Student Portal | <https://studentportal.itt-tech.edu>)

- ITT Tech Virtual Library> Main Menu> Books> Books 24x7
 - Craft, M. (2003). *Faster smarter Network+ Certification.* Redmond, WA: Microsoft Press.
 - Dyson, P. (1999). *Dictionary of networking.* San Francisco: Network Press.

- Edwards, J. & Bramante, R. (2009). *Networking self-teaching guide: OSI, TCP/IP, LANs, MANs, WANs, implementation, management, and maintenance*. Hoboken, NJ: James Wiley & Sons.
- ITT Tech Virtual Library> Main Menu> Books> Ebrary
 - Blank, A. G. (2004). *TCP/IP foundations*. Alameda, CA: Sybex.
 - Blank, A. G. (2002). *TCP/IP jumpstart: Internet protocol basics*. Alameda, CA: Sybex.
 - Ciccarelli, P. & Faulkner, C. (2004). *Networking foundations*. Alameda, CA: Sybex.
 - Dostálek, L. & Kabelová, A. (2006). *Understanding TCP/IP*. Packt Publishing Ltd. Olten, Birmingham, GBR.
 - Sauter, M. (2010). *From GSM to LTE: An introduction to mobile networks and mobile broadband*. Hoboken, NJ: James Wiley & Sons.
 - Wetteroth, D. (2001). *OSI reference model for telecommunications*. Blacklick, OH: McGraw-Hill Professional Publishing.
- ITT Tech Virtual Library> Main Menu> School of IT (under Locate Resources by Your School of Study or General Education)> Recommended Links
 - ComputerWorld: <http://www.computerworld.com/>
 - eWeek: <http://www.eweek.com/>
 - InformationWeek: <http://www.informationweek.com/>
 - Network Computing: <http://www.networkcomputing.com/>
 - PC Magazine: <http://www.pcmag.com/>
 - PC World: <http://www.pcworld.com/>

Other References

CD

- Cisco Learning. (2004). *Network+ fundamentals and certification: Software certification kit*. New York: New Riders.
- Video Education America. (2008). *Inside a computer*. White Plains, NY: Video Education America.

Websites

- *Fiber Optic Cable Single-Mode/Multi-Mode Tutorial*: <http://www.arcelect.com/fibercable.htm>

This tutorial, offered by ARC Electronics, explains fiber optic cabling, with links to additional resources.

- *Internetworking Technology Handbook—Routing Basics*:
http://docwiki.cisco.com/wiki/Internetworking_Technology_Handbook

This site from Cisco Systems explains routing.

- *IPv6: The Next Generation Internet*: <http://www.ipv6.org/>

This page provides links to information about the IPv6 protocol and existing implementations.

- *Protocols Directory*: <http://www.protocols.com/protocols.htm>

This portal page provides links to information about the function, structure, and parameters of common protocols.

- *Routing*: <http://www.freesoft.org/CIE/Topics/87.htm>

This article from Connected: An Internet Encyclopedia explains routing.

- *Standards Development Overview*: <http://www.tiaonline.org/standards>

The Telecommunications Industry Association (TIA) develops voluntary industry standards for a wide variety of telecommunications products.

- *What Is Spyware and Adware*: <http://www.spychecker.com/spyware.html>

This page from Spychecker distinguishes spyware and adware.

NOTE: All links are subject to change without prior notice.

Information Search

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- OSI model
- TCP/IP model
- Protocols
- Connection-oriented communication
- Connectionless communication
- Circuit-switched
- Packet-switched
- Collision domain
- Broadcast domain
- Local Area Network (LAN)
- Wide Area Network (WAN)
- Metropolitan Area Network (MAN)
- Global Area Network (GAN)
- Personal Area Network (PAN)
- Network infrastructure
- Network standards

Suggested Learning Approach

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
<ul style="list-style-type: none">▪ Do take a proactive learning approach▪ Do share your thoughts on critical issues and potential problem solutions▪ Do plan your course work in advance▪ Do explore a variety of learning resources in addition to the textbook▪ Do offer relevant examples from your experience▪ Do make an effort to understand different points of view▪ Do connect concepts explored in this course to real-life professional situations and your own experiences	<ul style="list-style-type: none">▪ Don't assume there is only one correct answer to a question▪ Don't be afraid to share your perspective on the issues analyzed in the course▪ Don't be negative about the points of view that are different from yours▪ Don't underestimate the impact of collaboration on your learning▪ Don't limit your course experience to reading the textbook▪ Don't postpone your work on the course deliverables – work on small assignment components every day

Course Outline

<p>Unit 1: COMPUTER STRUCTURES REVIEW</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> Describe how digital devices store data. Describe the differences between input and output devices. 			<p>Total outside work: 13 hours</p>
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 1: Introduction to Computer Data Richardson, Lab Manual, Chapter 1 		
OUTSIDE WORK	Activity	Estimated Time	
	Read Chapters 1 and 2 (Odom, Richardson)	5 hrs.	
	Complete Computer Basics Review (Chapter 1)	1.5 hrs.	
	Complete Lab 1.1, 1.2, 1.3, 1.4	3.5 hrs.	
	Complete the Unit 1 Research Project assignment	3 hrs.	
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 1 Assignment 1: Computer Basics Review	2%
	Lab	Unit 1 Lab 1.1: Reading Binary Unit 1 Lab 1.2: Binary Math and Logic Unit 1 Lab 1.3: Bit and Byte Structure Unit 1 Lab 1.4: ASCII Unit 1 Lab 1.5: Creating a File System Unit 1 Lab 1.6: Gathering System Information Unit 1 Lab 2.4: Command Line Interface Unit 1 Lab 3.5: Sharing Network Resources	3%
	Research Project	Unit 1 Research Project 1: Chapter 2 Mind Maps (ePortfolio)	1%

<p>Unit 2: COMPUTER NETWORKS</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> Define a computer network. Identify the primary needs for computer networks and network applications. Draw the four major physical network topologies: bus, star, ring, and mesh. 			<p>Total outside work: 12 hours</p>
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 2: Introduction to Computer Networking Richardson, Lab Manual, Chapter 2 and Lab 6.3 		
OUTSIDE WORK	Activity	Estimated Time	
	Read Chapter 3 (Odom, Richardson)	2.5 hrs.	
	Complete Computer Basics Review (Chapter 2)	3.75 hrs.	
	Complete Lab 2.3	.75 hrs.	
	Identifying Network Topologies	.5 hrs.	
	Complete Unit 2 Research Project assignment	3 hrs.	
	Unit 3 Quiz 1 prep (covering Units 1-3)	1.5 hrs.	

	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
GRADED ACTIVITIES/ DELIVERABLES	Assignment	Unit 2 Assignment 1: Identifying Network Topologies	2%
		Unit 2 Assignment 2: Computer Basics Review	2%
	Lab	Unit 2 Lab 6.3: WLAN Router Configuration Unit 2 Lab 2.1: Connecting Computers Unit 2 Lab 2.2: Network Drives Unit 2 Lab 2.3: Network Types and Topologies	3%
	Research Project	Unit 2 Research Project 1: Chapter 3 Mind Maps (ePortfolio)	1%

Unit 3: NETWORKING MODELS			
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> • Compare and contrast the OSI and TCP/IP models and their applications to actual networks. • Differentiate between proprietary and nonproprietary protocols. • Explain the use of IP addressing in data networks. 		Total outside work: 8.5 hours	
READING ASSIGNMENT	<ul style="list-style-type: none"> • Odom, Chapter 3: TCP/IP Networks • Richardson, Lab Manual, Chapter 3 		
OUTSIDE WORK	Activity	Estimated Time	
	Read Chapter 4 (Odom, Richardson)	2.5 hrs.	
	Complete Networking Models Review (Chapter 3 review)	3 hrs.	
	Complete Unit 3 Research Project assignment	3 hrs.	
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
GRADED ACTIVITIES/ DELIVERABLES	Assignment	Unit 3 Assignment 1: Networking Models Review	2%
	Lab	Unit 3 Lab 3.1: Network Reference Models Unit 3 Lab 3.2: The OSI Reference Model Unit 3 Lab 3.3: The TCP/IP Model Unit 3 Lab 3.4: Data Link Connections	3%
	Research Project	Unit 3 Research Project 1: Chapter 4 Mind Maps (ePortfolio)	1%
	Quiz	Unit 3 Quiz 1	5%

Unit 4: PHYSICAL LAYER NETWORK CONCEPTS		
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> • Explain the fundamentals of electrical circuits. • Identify different types of physical cabling. • Identify wireless network communication needs. • Distinguish among the different needs for wired and wireless networks. • Classify Layer 2 networking components used in a typical LAN. • Compare and contrast advantages and disadvantages of network media. • Use basic troubleshooting techniques to ensure network connectivity at Layers 1 		Total outside work: 9.5 hours

and 2.			
READING ASSIGNMENT	<ul style="list-style-type: none"> • Odom, Chapter 4: Transmitting Bits • Richardson, Lab Manual, Chapter 4 		
OUTSIDE WORK	Activity		Estimated Time
	Read Chapter 5 (Odom, Richardson)		2.5 hrs.
	Complete Physical Layer Network Concepts (Chapter 4 review)		2.5 hrs.
	Complete the Unit 4 Research Project assignment		3 hrs.
	Study for the Midterm Exam (Units 1-5)		1.5 hrs.
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 4 Assignment 1: Physical Layer Network Concepts Review	2%
	Lab	Unit 4 Lab 4.1: Copper Cabling Unit 4 Lab 4.2: Data Link Connections Unit 4 Lab 4.3: Cabling Exploration Unit 4 Lab 4.4: Cable Troubleshooting	3%
	Research Project	Unit 4 Research Project 1: Chapter 5 Mind Maps (ePortfolio)	1%

Unit 5: ETHERNET LOCAL AREA NETWORKS			
Upon completion of this unit, students are expected to:			Total outside work:
<ul style="list-style-type: none"> • Define Ethernet LAN concepts. • Evaluate the advantages and disadvantages of Ethernet technology in LANs. • Analyze the advantages of using Layer 2 devices to segment LANs. • Troubleshoot wired LANs for connectivity and performance. 			12 hours
READING ASSIGNMENT	<ul style="list-style-type: none"> • Odom, Chapter 5: Ethernet LANs • Richardson, Lab Manual, Chapter 5 		
OUTSIDE WORK	Activity		Estimated Time
	Read Chapter 6 (Odom, Richardson)		3 hrs.
	Complete Unit 5 Assignment 1: Exploring LAN Switches		2 hrs.
	Complete Unit 5 Assignment 2 Ethernet Local Area Networks Review (Chapter 5 Review)		3 hrs.
	Complete the Unit 5 Research Project		3 hrs.
	Study for the Midterm (Units 1-5)		1 hrs.
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 5 Assignment 1: Exploring LAN Switches	2%
		Unit 5 Assignment 2: Ethernet Local Area Networks Review	2%
	Lab	Unit 5 Lab 5.1: LAN Standards Unit 5 Lab 5.2: MAC and IP Addresses Unit 5 Lab 5.3: Finding Network Settings Unit 5 Lab 5.4: Basic Network Troubleshooting	3%

	Research Project	Unit 5 Research Project 1: Chapter 6 Mind Maps (ePortfolio)	1%
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<p>Unit 6: WIRELESS ETHERNET LOCAL AREA NETWORKS</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> Identify devices required in wireless networks. Differentiate between Layer 1 and Layer 2 concepts in wireless networks. Analyze wireless standards. Design a basic small business wireless Ethernet network. Troubleshoot wireless LANs for connectivity and performance. <p style="text-align: right;">Total outside work: 10 hours</p>			
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 6: Wireless LANs Richardson, Lab Manual, Chapter 6 		
OUTSIDE WORK	Activity		Estimated Time
	Read Chapter 7 (Odom, Richardson)		2 hrs.
	Complete Unit 6 Assignment 1: Wireless Ethernet Local Area Networks (Chapter 6 Review)		3 hrs.
	Complete the Unit 6 Research Project		3 hrs.
		Complete Unit 6 Lab 6.1	2 hrs.
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 6 Assignment 1: Wireless Ethernet Local Area Networks Review	2%
	Lab	Unit 6 Lab 6.1: Wireless Broadcast Domains Unit 6 Lab 6.2: Identifying WLANs Unit 6 Lab 6.4: WLAN Placement Unit 6 Lab 6.5: WLAN Security	3%
	Research Project	Unit 6 Research Project 1: Chapter 7 Mind Maps (ePortfolio)	1%
	Exam	Midterm Exam: Units 1-5	10%

<p>Unit 7: WIDE AREA NETWORKS</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> Differentiate among WAN technologies available from service providers. Evaluate how WAN devices function. Define and describe WAN protocols. Evaluate troubleshooting techniques for WAN connections. <p style="text-align: right;">Total outside work: 9 hours</p>			
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 7: Wide Area Networks Richardson, Lab Manual, Chapter 7 		
OUTSIDE WORK	Activity		Estimated Time
	Read Chapter 8 (Odom, Richardson)		3 hrs.
	Complete Unit 7 Assignment 1: Wide Area Networks Review (Chapter 7 Review)		3 hrs.
	Complete the Unit 7 Research Project		3 hrs.

	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
GRADED ACTIVITIES/ DELIVERABLES	Assignment	Unit 7 Assignment 1: Wide Area Networks Review	2%
	Lab	Unit 7 Lab 7.1: Distance Considerations Unit 7 Lab 7.2: WAN Connections Unit 7 Lab 7.3: Communication Paths Unit 7 Lab 7.4: Linux Networking Unit 7 Lab 2.5: Linux <i>man</i> Pages Unit 7 Lab 7.4: Linux Networking	3%
	Research Project	Unit 7 Research Project 1: Chapter 8 Mind Maps (ePortfolio)	1%

Unit 8: NETWORKING PROTOCOLS			
Upon completion of this unit, students are expected to:		Total outside work: 13.5 hours	
<ul style="list-style-type: none"> Explain the functionality of typical network protocols. Plan and design an IP network by applying subnetting skills. Categorize TCP/IP protocols according to network model layers. Describe how TCP/IP addressing moves data packets through networks. 			
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 8: The Internet Protocol Richardson, Lab Manual, Chapter 8 		
OUTSIDE WORK	Activity	Estimated Time	
	Read Chapters 9 (Odom, Richardson)	3.5 hrs.	
	Complete Networking Protocols Review (Chapter 8 review)	3.5 hrs.	
	Complete Unit 8 Assignment 1	1.5 hrs.	
	Complete the Unit 8 Research Project	3.5 hrs.	
	Unit 9 Quiz 2 prep (Units 6-8)	1.5 hrs.	
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 8 Assignment 1: Calculating Subnets	2%
		Unit 8 Assignment 2: Networking Protocols Review	2%
	Lab	Unit 8 Lab 8.1: IP Addressing and Classes Unit 8 Lab 8.2: Assigning Static IP Addresses Unit 8 Lab 8.3: Routing Tables Unit 8 Lab 8.4: SOHO Planning	3%
	Research Project	Unit 8 Research Project 1: Chapter 9 Mind Maps (ePortfolio)	1%

Unit 9: INTERNET TECHNOLOGIES	
Upon completion of this unit, students are expected to:	
<ul style="list-style-type: none"> Relate how different technologies are used to access the Internet. Define how IP routing is used in the Internet to move data from source to destination. Define classless routing. 	
Total outside work: 10 hours	

<ul style="list-style-type: none"> Evaluate the need for NAT, PAT, CIDR, and IPv6 in current networks. 			
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 9: The Internet Richardson, Lab Manual, Chapter 9 		
OUTSIDE WORK	Activity		Estimated Time
	Read Chapter 10 (Odom, Richardson)		2 hrs.
	Complete Internet Technologies Review (Chapter 9 review)		3 hrs.
Complete the Unit 9 Research Project		5 hrs.	
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 9 Assignment 1: Internet Technologies Review	2%
	Lab	Unit 9 Lab 9.1: Broadband Internet Unit 9 Lab 9.2: Networks and Subnets Unit 9 Lab 9.3: Internet Protocol version 6 (IPv6) Unit 9 Lab 9.4: Configuring an FTP Service	3%
	Research Project	Unit 9 Research Project 1: Network Design, Part 1 (ePortfolio)	1%
	Quiz	Unit 9 Quiz 2	5%

Unit 10: TRANSPORTING DATA THROUGH NETWORKS			Total outside work: 12 hours
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> Define how data logically moves through networks. Compare and contrast TCP and UDP transportation techniques. 			
READING ASSIGNMENT	<ul style="list-style-type: none"> Odom, Chapter 10: TCP/IP Transport Richardson, Lab Manual, Chapter 10 		
OUTSIDE WORK	Activity		Estimated Time
	Complete Transporting Data through Networks (Chapter 10 review)		1.5 hrs.
	Complete the Unit 10 Research Project		5.5 hrs.
Final Exam prep		5 hrs.	
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 10 Assignment 1: Transporting Data through Networks Review	2%
	Lab	Unit 10 Lab 10.1: Transport Layer Networking Protocols Unit 10 Lab 10.2: Common Network Ports Unit 10 Lab 10.3: Network Management Unit 10 Lab 10.4: Analyzing Protocols in Packet Capture	3%
	Research Project	Unit 10 Research Project 1: Network Design, Part 2 (ePortfolio)	1%

Unit 11: COURSE REVIEW AND FINAL EXAMINATION Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> • Show competency in all outcomes for this course. • Master the final examination. 			Total outside work: 0
READING ASSIGNMENT	<ul style="list-style-type: none"> • None 		
OUTSIDE WORK	Activity		Estimated Time
	None		NA
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Presentation	Unit 11 Presentation 1: Network Design Presentation	4%
	Exam	Final Exam: Units 1-10	10%

Note: Your instructor may add a few learning activities that will change the grade allocation for each assignment in a category. The overall category percentages will not change.

Evaluation and Grading

Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	Weight
Assignment	26%
Research Project	10%
Presentation	4%
Lab	30%
Quiz	10%
Exam	20%
TOTAL	100%

Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade	Percentage
A (4.0)	90–100%
B+ (3.5)	85–89%
B (3.0)	80–84%
C+ (2.5)	75–79%
C (2.0)	70–74%
D+ (1.5)	65–69%
D (1.0)	60–64%
F (0.0)	<60%

Academic Integrity

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

(End of Syllabus)