ITT Technical Institute

NT1210

Introduction to Networking

Onsite Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 56 (34 Theory Hours, 22 Lab Hours)

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

Prerequisites: NT1110 Computer Structure and Logic or equivalent

Course Description:

This course serves as a foundation for the study of computer networking technologies. Concepts in data communications, such as signaling, coding and decoding, multiplexing, circuit switching and packet switching, OSI and TCP/IP models, LAN/WAN protocols, network devices and their functions, topologies and capabilities are discussed. Industry standards and the development of networking technologies are surveyed in conjunction with a 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 Network System Administration and the associate program in Electrical Engineering Technology. The following diagrams demonstrate how this course fits in each program.

Associate Program in Network Systems Administration
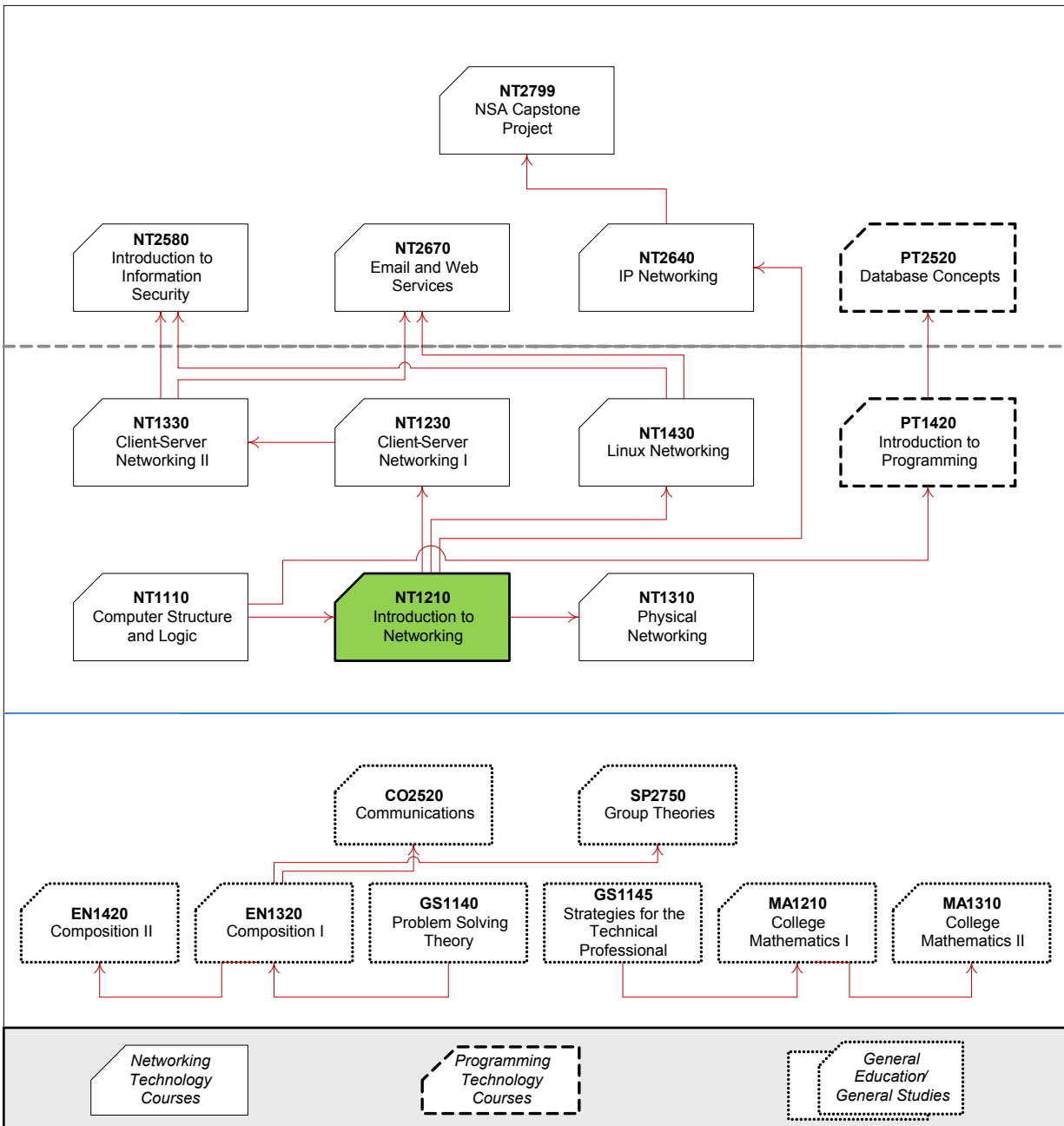
Associate Program in Electrical Engineering Technology
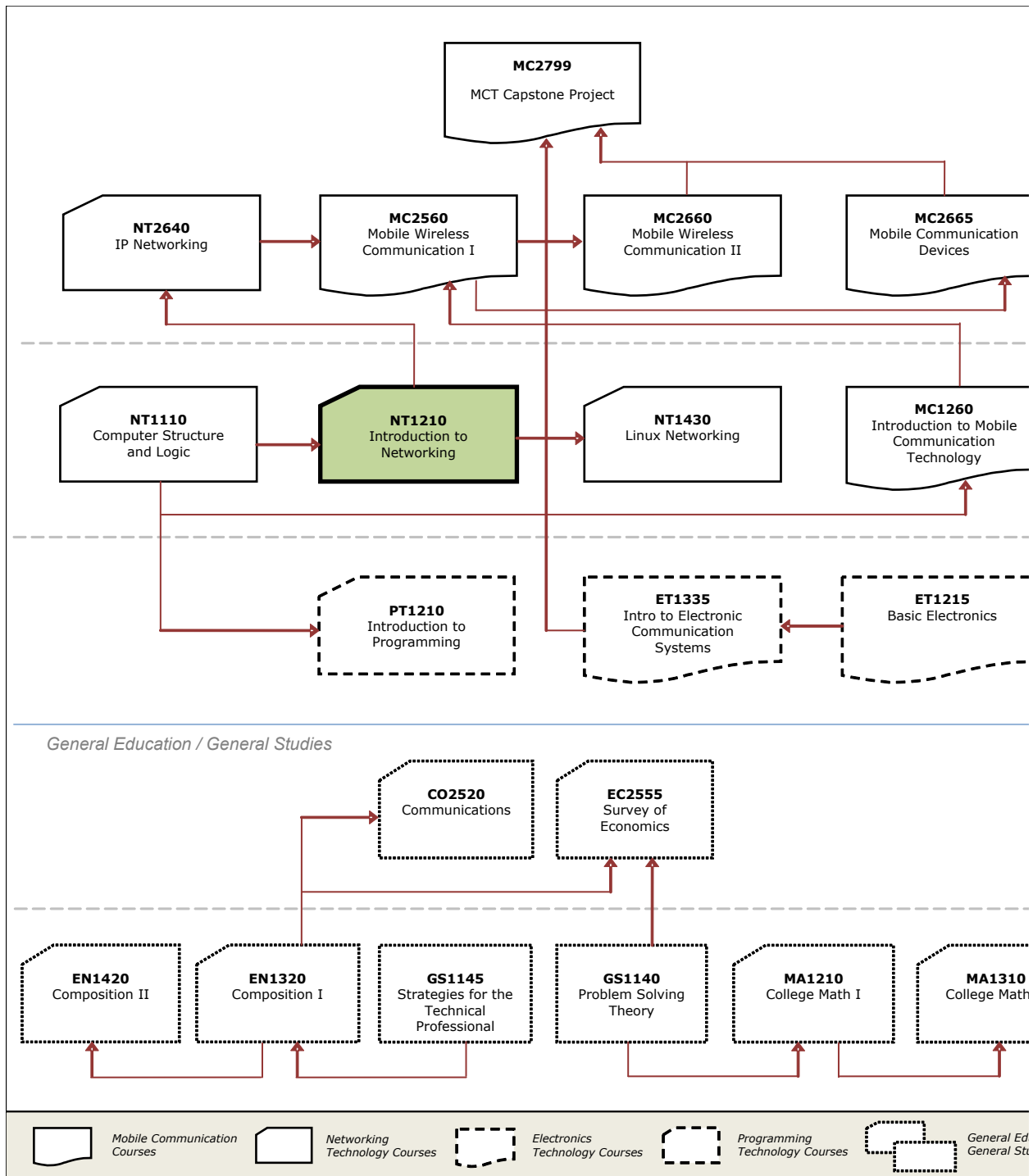
NOTE: *Refer to the catalog for the state-specific course and program information, if applicable.*

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). Introduction to Networking. Boston, MA: Pearson.	■		
Richardson, T. (2013). Introduction to Networking Lab Manual. Boston, MA: Pearson.	■		
Other Items	**New to This Course**	**Carried over from Previous Course(s)**	**Required for Subsequent Course(s)**

Software
 	
  ▪ Prebuilt Virtual Machines, Windows and Linux
 	
  ▪ Wild Packets OmniPeek Network Analyzer (Preinstalled in Windows VM)
 	
  ▪ Wireshark Network Protocol Analyzer (Preinstalled in Windows VM)
	■		■

Equipment Needed
 	
  ▪ Linksys Wireless E3000 WLS N (2)
 	
  ▪ TRENDnet Wireless USB Adapter TEW424UB (30)
	■		■

Other ▪ 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.

- o Dyson, P. (1999). *Dictionary of networking.* San Francisco: Network Press.
- o 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
  - o Blank, A. G. (2004). *TCP/IP foundations*. Alameda, CA: Sybex.
  - o Blank, A. G. (2002). *TCP/IP jumpstart: Internet protocol basics*. Alameda, CA: Sybex.
  - o Ciccarelli, P. & Faulkner, C. (2004). *Networking foundations*. Alameda, CA: Sybex.
  - o Dostálek, L. & Kabelová, A. (2006). *Understanding TCP/IP*. Packt Publishing Ltd. Olten, Birmingham, GBR.
  - o Sauter, M. (2010). *From GSM to LTE: An introduction to mobile networks and mobile broadband*. Hoboken, NJ: James Wiley & Sons.
  - o 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
  - o ComputerWorld: http://www.computerworld.com/
  - o eWeek: http://www.eweek.com/
  - o InformationWeek: http://www.informationweek.com/
  - o Network Computing: http://www.networkcomputing.com/
  - o PC Magazine: http://www.pcmag.com/
  - o 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:

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- 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
- 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	- 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

Unit 1: COMPUTER STRUCTURES REVIEW			
Upon completion of this unit, students are expected to: • Describe how digital devices store data. • Describe the differences between input and output devices.			**Total outside work:** 13 hours

READING ASSIGNMENT	• 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 Chapter 1 review	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	Lab 1.1: Reading Binary Lab 1.2: Binary Math and Logic Lab 1.3: Bit and Byte Structure Lab 1.4: ASCII Lab 1.5: Creating a File System Lab 1.6: Gathering System Information Lab 2.4: Command Line Interface Lab 3.5: Sharing Network Resources	3%
	Research Project	Unit 1 Research Project 1: Chapter 2 Mind Maps	1%

Unit 2: COMPUTER NETWORKS			
Upon completion of this unit, students are expected to: • 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.			**Total outside work:** 11.5 hours

READING ASSIGNMENT	• 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 Chapter 2 review	3.75 hrs.
	Complete Lab 2.3	.75 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	3%
		Unit 2 Lab 2.1: Connecting Computers	
		Unit 2 Lab 2.2: Network Drives	
		Unit 2 Lab 2.3: Network Types and Topologies	
	Research Project	Unit 2 Research Project 1: Chapter 3 Mind Maps	1%

Unit 3: NETWORKING MODELS

Upon completion of this unit, students are expected to:

- 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	• Odom, Chapter 3: TCP/IP Networks • Richardson, Lab Manual Chapter 3	

	Activity	Estimated Time
OUTSIDE WORK	Read Chapter 4 (Odom, Richardson)	2.5 hrs.
	Complete 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	3%
		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	
	Research Project	Unit 3 Research Project 1: Chapter 4 Mind Maps	1%
	Quiz	Unit 3 Quiz 1	5%

Unit 4: PHYSICAL LAYER NETWORK CONCEPTS

Upon completion of this unit, students are expected to:

- 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 and 2.

Total outside work:
9.5 hours

READING ASSIGNMENT	• Odom, Chapter 4: Transmitting Bits • Richardson, Lab Manual Chapter 4	

	Activity	Estimated Time
OUTSIDE WORK	Read Chapter 5 (Odom, Richardson)	2.5 hrs.
	Complete 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.

	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
GRADED ACTIVITIES/ DELIVERABLES	Assignment	Unit 4 Assignment 1: Physical Layer Network Concepts Review	2%
	Lab	Unit 4 Lab 4.1: Copper Cabling	3%
		Unit 4 Lab 4.2: Data Link Connections	
		Unit 4 Lab 4.3: Cabling Exploration	
		Unit 4 Lab 4.4: Cable Troubleshooting	
	Research Project	Unit 4 Research Project 1: Chapter 5 Mind Maps	1%

Unit 5: ETHERNET LOCAL AREA NETWORKS	
Upon completion of this unit, students are expected to: • 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.	*Total outside work:* 12 hours

READING ASSIGNMENT	• Odom, Chapter 5: Ethernet LANs • Richardson, Lab Manual Chapter 5	

	Activity	Estimated Time
OUTSIDE WORK	Read Chapter 6 (Odom, Richardson)	3 hrs.
	Unit 5 Assignment 1: Exploring LAN Switches	2 hrs.
	Unit 5 Assignment 2: Ethernet Local Area Networks Review	3 hrs.
	Unit 5 Research Project 1: Chapter 6 Mind Maps	3 hrs.
	Study for the Midterm (Units 1-5)	1 hrs.

	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
GRADED ACTIVITIES/ DELIVERABLES	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	3%
		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	
	Research Project	Unit 5 Research Project 1: Chapter 6 Mind Maps	1%

Unit 6: WIRELESS ETHERNET LOCAL AREA NETWORKS			
Upon completion of this unit, students are expected to: • 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.			*Total outside work:* 10 hours

READING ASSIGNMENT	• Odom, Chapter 6: Wireless LANs • Richardson, Lab Manual Chapter 6		

	Activity		**Estimated Time**
OUTSIDE WORK	Read Chapter 7 (Odom, Richardson)		2 hrs.
	Unit 6 Assignment 1: Wireless Ethernet Local Area Networks Review		3 hrs.
	Unit 6 Research Project 1: Chapter 7 Mind Maps		3 hrs.
	Unit 6 Lab 6.1: Wireless Broadcast Domains		2 hrs.

	Grading Category	**Activity/Deliverable Title**	**Grade Allocation** (% of all graded work)
GRADED ACTIVITIES/ DELIVERABLES	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	1%
	Exam	Midterm Exam: Units 1-5	10%

Unit 7: WIDE AREA NETWORKS			
Upon completion of this unit, students are expected to: • Differentiate among WAN technologies available from service providers. • Evaluate how WAN devices function. • Define and describe WAN protocols. • Evaluate troubleshooting techniques for WAN connections.			*Total outside work:* 9 hours

READING ASSIGNMENT	• Odom, Chapter 7: Wide Area Networks • Richardson, Lab Manual Chapter 7		

	Activity		**Estimated Time**
OUTSIDE WORK	Read Chapter 8 (Odom, Richardson)		3 hrs.
	Unit 7 Assignment 1: Wide Area Networks Review		3 hrs.
	Unit 7 Research Project 1: Chapter 8 Mind Maps		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 *man* Pages
Unit 7 Lab 7.4: Linux Networking | 3% |
| | Research Project | Unit 7 Research Project 1: Chapter 8 Mind Maps | 1% |

Unit 8: NETWORKING PROTOCOLS

Upon completion of this unit, students are expected to:

- 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.

Total outside work:
13.5 hours

READING ASSIGNMENT	• Odom, Chapter 8: The Internet Protocol • Richardson, Lab Manual Chapter 8	

	Activity	Estimated Time
OUTSIDE WORK	Read Chapters 9 (Odom, Richardson)	3.5 hrs.
	Complete Chapter 8 review	3.5 hrs.
	Complete Unit 8 Calculating Subnets	1.5 hrs.
	Complete Unit 8 research project	3.5 hrs.
	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	Lab 8.1: IP Addressing and Classes Lab 8.2: Assigning Static IP Addresses Lab 8.3: Routing Tables Lab 8.4: SOHO Planning	3%
	Research Project	Unit 8 Research Project 1: Chapter 9 Mind Maps	1%

Unit 9: INTERNET TECHNOLOGIES			
Upon completion of this unit, students are expected to: • 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. • Evaluate the need for NAT, PAT, CIDR, and IPv6 in current networks.			**Total outside work:** 10 hours

READING ASSIGNMENT	• Odom, Chapter 9: The Internet • Richardson, Lab Manual Chapter 9		
OUTSIDE WORK	**Activity**		**Estimated Time**
	Read Chapter 10 (Odom, Richardson)		2 hrs.
	Complete Chapter 9 review questions		3 hrs.
	Complete 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	Lab 9.1: Broadband Internet Lab 9.2: Networks and Subnets Lab 9.3: Internet Protocol Version 6 (IPv6) Lab 9.4: Configuring an FTP Service	3%
	Research Project	Unit 9 Research Project 1: Network Design, Part 1	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: • Define how data logically moves through networks. • Compare and contrast TCP and UDP transportation techniques.			

READING ASSIGNMENT	• Odom, Chapter 10: TCP/IP Transport • Richardson, Lab Manual Chapter 10	

OUTSIDE WORK	Activity	Estimated Time
	Complete Chapter 10 review	1.5 hrs.
	Complete the Unit 10 research assignment	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	Lab 10.1: Transport Layer Networking Protocols Lab 10.2: Common Network Ports Lab 10.3: Network Management Lab 10.4: Analyzing Protocols in Packet Capture	3%
	Research Project	Unit 10 Research Project 1: Network Design, Part 2	1%

Unit 11: FINAL EXAM			Total outside work: 0
Upon completion of this unit, students are expected to: • Show competency in all outcomes for this course. • Master the final examination.			

READING ASSIGNMENT	• None	

OUTSIDE WORK	Activity	Estimated Time
	None	

GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Research Project	Network Design, Part 2 Presentation	4%
	Exam	Final Exam—Units 1-10	10%

† Candidate for ePortfolio

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)