

ADVANCED TELECOMMUNICATIONS I

CIT 370 v3
WKU On Demand

Course Description

This technology-enhanced course provides an overview of computer networking. The intent of the course is to provide the background and context of data networks in a business environment. As such, the course is not a hands-on course teaching network operating systems but rather covers the concepts, terminology, and functionality of networks.

Required Textbook

The textbooks and material for this course is as follows:

1. TEXTBOOK: Network+ Guide to Networks, 5th Edition by Tamara Dean (ISBN-13: 9781423902454).
2. ACCESS CODE: Web-Based Labs for Network+ Guide to Networks, 5th Edition (ISBN-13: 9781423902409).

There are different methods that you may use to acquire this material. Choose any one of the following options that is best for you:

1. *Textbook Bundle* - A package that contains both the textbook and the access code is available for this course; the ISBN is 1423987004.
2. *Electronic Books or Chapters* – You may purchase electronic versions of the book or individual chapters at *ichapters.com*. However, you will still need to purchase separately the Access Code.

Instructor

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Office Hours: M-TH 8:15 AM – 3:00 PM

I am an Assistant Professor of Computer Information Systems at Western Kentucky University in Bowling Green, Kentucky and hold a PhD from Indiana State University in Digital Communication Systems. Prior to this I was an Associate Professor and served as the Director of Academic Computing at Volunteer State Community College in Gallatin, Tennessee for 20 years. I have worked in the IT industry as a computer consultant for the U.S. Postal Service, the Tennessee Municipal Technical Advisory Service, and the University of Tennessee. I have also written over 22 college technology textbooks, including *CWNA Guide to Wireless LANs 3ed*, *Guide to Wireless Communications*, *Security+ Guide to Network Security Fundamentals 4ed*, *Security Awareness: Applying Practical Security in Your World 4ed*, and *Networking BASICS*.

Course Material

All online material for this course is available through WKU's Blackboard system (<http://ecourses.wku.edu>).

Grading

Activity	Percentage
Assignments	35%
Exams	25%
Final exam	40%

Final Percentage	Letter Grade
100-90	A
89-80	B
79-70	C
69-60	D
59-0	F
Other	I (Incompletes handled on a case-by-case basis)

- Grade A: Exemplary work. The quality of work at this level could be used to demonstrate mastery of the subject matter and could serve as a model to others of the kind of superior work that can be accomplished by graduates from the school. This level of work is outstanding both in content and presentation. The student displays initiative, independence, and often originality.
- Grade B: Commendable work. The work is logically organized and technically correct. A grade of B indicates an unquestioned grasp of the subject fundamentals and principles and an understanding of their significance. B work often shows initiative.
- Grade C: Adequate work. A C usually indicates that the student has presented work that is fairly logical in organization and technique, but it is lacking in thoughtfulness and completeness.
- Grade D: Inadequate work. A D demonstrates little ingenuity, integrity, or care.
- Grade F: Unacceptable work. This level of work is poorly organized and technically faulty and demonstrates little, if any, grasp of basic facts and principles. In addition, if a student fails to complete all of the assignments in a timely manner, they will receive an F in this course.

Activities

Below is a summary list of the primary activities that you will perform. The list of specific activities and due dates are contained a document entitled "Course

Activities” posted on Blackboard. A brief explanation of the activity and any deliverable associated with it are as follows:

ACTIVITIES

1. *Read Textbook Chapter* - You will read textbook chapters as assigned.
Deliverable: none.
2. *Watch Lecture Video* – You will watch a lecture video of each chapter of approximately one hour in length. These videos (WMV) can be viewed either online or downloaded to your local computer to watch. Several of these videos also are in iPod format (M4V) and have the audio (MP3) available for download. In addition there are optional lecture videos that may also be viewed. **Deliverable:** none.
3. *Answer Textbook Review Questions* - You will answer the textbook review questions at the end of each chapter. **Deliverable:** You will submit your answers through an online format that displays the questions as they appear in the textbook and allows you to enter your responses.
4. *Take Practice Test* – You will take a practice test for each chapter. Your score must be at least 70% (7 out of 10); however, you can retake it an unlimited number of times but the highest score is recorded. The results of this practice test will show you which questions you answered correctly and which questions you missed; however, it will not tell you the correct answers of any missed questions.
5. *Take Chapter Test* – You will take a practice test for each chapter. The chapter test is open book but you may only take it one time.
6. *Perform Web-Based Labs* – Web-Based Labs (WBL) are network simulation exercises that are performed in a real lab environment over the Internet. These labs are based upon the Hands-On Projects at the end of each chapter in the textbook. **Deliverable:** After you have completed **ALL** labs for the entire course you will send to the instructor a “Roll-Up” of the results of all labs.
7. *Complete OPNET Lab* – You will complete 5 OPNET simulation labs during the course.
8. *Take Final Exam* - The Final Exam is comprehensive and you may not use your book or notes. It must be taken in a proctored environment.

You may discuss any aspect of a grade received for up to seven (7) calendar days after the grade is posted or returned to you. After this deadline the grade can no longer be reviewed.

Tests

There are three types of tests for this course

1. Practice test
 - a. Score must be at least 70%
 - b. Can be retaken an unlimited number of times
 - c. Highest score counts
2. Chapter test

- a. Open book
 - b. Not timed
 - c. Can be taken one time
- 3. Final exam
 - a. Taken in proctored setting
 - b. Closed book
 - c. Can be taken one time

E-Mail

The best way to contact me is via e-mail at *mark.ciampa@wku.edu*. Because of the volume of e-mails that I receive from students e-mail messages must be filtered. In order for your messages from this class to be filtered properly and receive my top attention it is required that the subject line of your e-mail be as follows: CIT 370 – Your Name – Topic of Message (*CIT 370 – John Smith – VTC Question*). Under normal circumstances I will respond no later than 24 hours after receiving your e-mail if it has this subject line; e-mail messages without this subject line may not be answered promptly.

Instructor Feedback

Due to the flexible nature of this course students will progress at their own pace through the material. The instructor does not send out a regular e-mail to the entire class since students may all be in a different activity.

In order to track your progress in the class please refer to your grades in Blackboard. If you still have any questions about your progress then please feel free to contact me.

Standards of Conduct

I expect all students to support the same respect for individuals, commitment to issue and problem resolution, and open communication and feedback as in any learning environment.

In addition to university standards, online students are expected to:

- Accept responsibility and accountability for all use actions and content posted to any online classroom, public meeting or personal inbox (e-mail).
- Maintain the same ethical standards expected in a collaborative, academic environment.
- Demonstrate respect for all faculty, students, and staff regardless of age, race, gender, religion, national origin, veteran's status, disability, or sexual orientation.

In the online environment, the following will not be tolerated:

- Harmful, threatening, libelous, or abusive content
- Profanity of any kind

- Copyright infringement or violation of patent, trademark, proprietary information, or confidentiality agreements
- Misrepresentation of identity through alteration of inbox (email) names
- Posting unsolicited advertisements to public meetings or private inboxes (no spamming)
- Transferring computer viruses, intentionally or unintentionally, or other code that disrupts or interferes with other users' use of the online environment or personal computers, systems, or networks.
- Unauthorized access to any university or other resources.)

I highly value academic honesty. A student must always submit work that represents his or her original words or ideas. If any words or ideas are used that do not represent the student's original words or ideas, then the student must cite all relevant sources. The student should also make it clear the extent to which such sources are used. Words or ideas that require citation include, but are not limited to, all hardcopy or electronic publications, whether copyrighted or not, and all verbal or visual communication when the content of such communication clearly originates from an identifiable source. All submissions to any public meeting or private mailbox fall within the scope of words and ideas that require citations if used by someone other than the original author.

Academic dishonesty in an online learning environment could involve the following:

- Having a tutor or friend complete a portion of your assignments
- Having a reviewer make extensive revisions to an assignment
- Copying work submitted by another student to a public class meeting
- Using information from on-line information services without proper citation

Any of these practices could result in charges of academic dishonesty. The penalty for academic dishonesty is a grade of F and possible expulsion from the university.

Technology

The following is a minimum of technology steps that you should observe:

- Have anti-virus, anti-spyware, and a personal firewall installed on your computer
- Perform regular backups of your course material
- Be sure that your computer is in good working order before the class begins
- Installing new hardware or software during the course of this class is not recommended
- Identify an alternative computer that you can use in the event that yours develops problems
- Identify an alternative Internet connection that you can use in the event that yours develops problems

Special Needs

Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services, Room 445, Potter Hall. The OFSDS telephone number is (270) 745-5004 V/TDD. Please do not request accommodations directly from the professor or instructor without a letter of accommodation from the Office for Student Disability Services.

Learning Objectives**Chapter 1**

- List the advantages of networked computing relative to stand-alone computing
- Distinguish between client/server and peer-to-peer networks
- List elements common to all client/server networks
- Describe several specific uses for a network
- Identify some of the certifications available to networking professionals
- Identify the kinds of skills and specializations that will help you excel as a networking professional

Chapter 2

- Identify organizations that set standards for networking
- Describe the purpose of the OSI model and each of its layers
- Explain specific functions belonging to each OSI model layer
- Understand how two network nodes communicate through the OSI model
- Discuss the structure and purpose of data packets and frames
- Describe the two types of addressing covered by the OSI model

Chapter 3

- Explain basic data transmission concepts, including full duplexing, attenuation, latency, and noise
- Describe the physical characteristics of coaxial cable, STP, UTP, and fiber-optic media
- Compare the benefits and limitations of different networking media
- Explain the principles behind and uses for serial connector cables
- Identify wiring standards and the best practices for cabling buildings and work areas

Chapter 4

- Identify and explain the functions of the core TCP/IP protocols
- Explain how the TCP/IP protocols correlate to layers of the OSI model
- Discuss addressing schemes for TCP/IP in IPv4 and IPv6
- Describe the purpose and implementation of DNS (Domain Name System) and DHCP (Dynamic Host Configuration Protocol)
- Identify the well-known ports for key TCP/IP services
- Describe common Application layer TCP/IP protocols

Chapter 5

- Describe the basic and hybrid LAN physical topologies, and their uses, advantages, and disadvantages
- Describe the backbone structures that form the foundation for most LANs
- Understand the transmission methods underlying Ethernet networks
- Compare the different types of switching used in data transmission

Chapter 6

- Identify the functions of LAN connectivity hardware
- Install, configure, and differentiate between network devices such as NICs, hubs, bridges, switches, routers, and gateways
- Explain the advanced features of a switch and understand popular switching techniques, including VLAN management
- Explain the purposes and properties of routing
- Describe common IPv4 and IPv6 routing protocols

Chapter 7

- Identify a variety of uses for WANs
- Explain different WAN topologies, including their advantages and disadvantages
- Compare the characteristics of WAN technologies, including their switching type, throughput, media, security, and reliability
- Describe several WAN transmission and connection methods, including PSTN, ISDN, T-carriers, DSL, broadband cable, ATM, and SONET
- Describe multiple methods for remotely connecting to a network

Chapter 8

- Explain how nodes exchange wireless signals
- Identify potential obstacles to successful wireless transmission and their repercussions, such as interference and reflection
- Define WLAN (wireless LAN) architecture
- Specify the characteristics of popular WLAN transmission methods, including 802.11 a/b/g/n
- Install and configure wireless access points and their clients
- Describe wireless MAN and WAN technologies, including 802.16 and satellite communications

Chapter 9

- Describe characteristics common to all NOSs (network operating systems)
- Compare and evaluate NOSs to select the right one for your network
- Define the requirements for and features of the Windows Server 2008 NOS
- Define the requirements for and features of UNIX and Linux NOSs

- Create users and groups and assign file permissions on systems running Windows Server 2008 and UNIX

Chapter 10

- List the methods of network design unique to TCP/IP networks, including subnetting, CIDR, and address translation
- Explain the differences between public and private TCP/IP networks
- Describe protocols used between mail clients and mail servers, including SMTP, POP3, and IMAP4
- Employ multiple TCP/IP utilities for network discovery and troubleshooting

Chapter 11

- Use terminology specific to converged networks
- Explain VoIP (voice over IP) services and their user interfaces
- Explain video-over-IP services and their user interfaces
- Describe VoIP and video-over-IP signaling and transport protocols, including SIP, H.323, and RTP
- Understand QoS (quality of service) assurance methods critical to converged networks, including RSVP and DiffServ

Chapter 12

- Identify security risks in LANs and WANs and design security policies that minimize risks
- Explain how physical security contributes to network security
- Discuss hardware- and design-based security techniques
- Explain methods of encryption, such as SSL and IPsec, that can secure data in storage and in transit
- Describe how popular authentication protocols, such as RADIUS, TACACS, Kerberos, PAP, CHAP, and MS-CHAP, function
- Use network operating system techniques to provide basic security
- Describe wireless security protocols, such as WEP, WPA, and 802.11i

Chapter 13

- Describe the steps involved in an effective troubleshooting methodology
- Follow a systematic troubleshooting process to identify and resolve networking problems
- Document symptoms, solutions, and results when troubleshooting network problems
- Use a variety of software and hardware tools to diagnose problems

Chapter 14

- Identify the characteristics of a network that keep data safe from loss or damage
- Protect an enterprise-wide network from viruses
- Explain network- and system-level fault-tolerance techniques

- Discuss issues related to network backup and recovery strategies
- Describe the components of a useful disaster recovery plan and the options for disaster contingencies

Chapter 15

- Explain network management and the importance of documentation, baseline measurements, policies, and regulations to assess and maintain a network's health
- Manage a network's performance using SNMP-based network management software, system and event logs, and traffic-shaping techniques
- Identify the reasons for and elements of an asset management system
- Plan and follow regular hardware and software maintenance routines