

CSCI 5360 – COMPUTER NETWORKING

CREDIT HOURS:	3
PREREQUISITES:	CSCI 3302
GRADE REMINDER:	Must have a grade of C or better in each prerequisite course.
CROSS LISTING:	CSCI 4335

CATALOG DESCRIPTION

Functional evolution and role of data communications. Considerations in data communications. Applications in General. The design issues. System components and their interrelationships. Networks.

PURPOSE OF COURSE

Acquire communication concepts and vocabulary; explore protocol organization, analysis and examples; develop simple distributed programs; review some of the social and economic aspects of networking.

NOTE: Students taking CSCI 5360 will be expected to complete additional requirements, including but not limited to special projects, class presentations, relevant research including literature review and current research topics from professional journals, and supplemental evaluation (i.e., additional questions, quizzes, tests). Students taking CSCI 5360 are expected to perform at a higher level than undergraduates taking CSCI 4335. Students should contact the course instructor early in the semester (i.e., before the end of the add/drop period) to determine the specific additional requirements.

EDUCATIONAL OBJECTIVES

The goal of this course is to have students develop computer communications and networking skills. Success will be evaluated through the completion of laboratory and project assignments, performance on homework problems, and analysis of exam responses. Specific skills include:

1. Demonstrate knowledge of models, standards, and protocols for communication.
2. Develop skills in problem solving involving information (voice/video/data) transfer.
3. Apply queuing systems techniques to network design and performance.
4. Analyze protocol design, analysis, and examples in a layered framework.
5. Analyze data integrity and network security.
6. Recognize communications concepts and vocabulary.
7. Develop simple distributed computing programs.
8. Generalize Internet networking and application development skills.
9. Develop skills in research literature reviews and research presentations.

COURSE CALENDAR

This course meets for a minimum of 37.5 lecture contact hours during the semester. Students have significant weekly extracurricular assignments which involve readings, programming, conceptual questions, or engaging in other forms of preparation. Students are expected to complete 4-5 major homework assignments related to the above topics as well as multiple in-class laboratory assignments involving programming, analyzing packet captures in Wireshark, and 2-3 periodic exams in addition to the final exam. Students are expected to prepare for any class assignments or quizzes over the material covered in class or the extracurricular activities. Successful completion of these activities requires at a minimum six additional hours of outside of classroom work each week.

CONTENT	Hours
Overview of Teleprocessing and Data Communications.....	3
Objectives, Principles, Models, Standards	
Transmission Fundamentals.....	3
Media, Services, Devices, Codes	
Analog and Digital Signals	
Modulation and Modems	
Data Communication	5
Transmission modes	
Interface Standards	
Multiplexing	
Contention Protocols	
Data Security and Integrity	7
Overview and Standards	
Parity, CRC, Hamming Codes	
Encryption and Decryption, Private and Public Key	
Data Integrity, Authentication, Signatures	
Viruses, Worms, Hacking	
Protocols	8
Overview and Simple Protocol	
Flow Control	
Sliding Window Protocols	
Protocol Correctness	
Example Data Link Protocols	
Local Area Networks	8
Topologies	
IEEE Standards (802.3, 802.4, 802.5, 802.11)	
Interconnecting LANs, DNS	
Wide Area Networks	5
Routing and Network Protocols	
Transport Protocols	
Example Protocols: ATM, Wireless	
Network Applications	3

TCP/IP Applications
BISDN/ATM

Exams (plus final).....3

TOTAL 45

REFERENCES

Aboelela, E., Network Simulation Experiments Manual, 2nd. Ed., (for Peterson, L. and Davie, B., Computer Networks: A Systems Approach, (4th. Ed.) MK, 2007), MK, 2008.

FitzGerald, J., and Dennis, A., Business Data Communications and Networking, 10th. Ed, Wiley, 2009.

Kurose and Rose, Computer Networking: A Top-Down Approach, 6th Ed., Pearson, 2012.

Peterson, L. and Davie, B., Computer Networks: A Systems Approach, (4th. Ed.) MK, 2007.

Stallings, W., Data and Computer Communications, 10th Ed., Prentice Hall, 2013.

Tanenbaum and Wetherall, Computer Networks, 5th Ed., Pearson, 2010