

UNIVERSITY OF DELAWARE
DEPARTMENT OF COMPUTER & INFORMATION SCIENCES
CISC 450-010: COMPUTER NETWORKS

Spring Semester, 2005
Tue and Thu, 12:30 - 1:45 pm
Gore 223

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Office Hours: Wed, 1:30 - 3 pm
and by appt.

Textbook:

Computer Networking: A Top-Down Approach Featuring the Internet by James F. Kurose and Keith W. Ross. Boston, MA: Addison-Wesley, 2005. Third Edition.

The text will be supplemented by selected readings from other books or from the literature.

Goals:

CISC 450 is one of the most popular elective courses in the department taken mostly by junior and senior undergraduate students. The aim of this course is to provide the student with a basic understanding of the principles, structure, and operation of computer networks. A student who successfully completes this course will acquire a strong knowledge of the protocols and mechanisms used in the Internet, and of the design and operation of both wide-area and local-area computer communication networks. The course will also involve implementation of simple protocols using application-level network programming.

Required Background:

Pre-requisites:

- CISC 360 (Computer Architecture) is an essential pre-requisite.
- CISC 301 (Elements of Logic and Automata Theory) is required to understand the operation of protocols as finite-state machines.
- MATH 205 (Statistical Methods) or equivalent is required for knowledge of basic probability theory.
- Good programming skills in the C or C++ languages are required.

Co-requisite:

- CISC 361 (Operating Systems) is a necessary co-requisite and may be taken concurrently.

Students can get credit for at most one of CISC 250, CISC 450, and CISC 650.

Contents:

1. Introduction: Network architectures and protocols; protocol layering; the Internet and OSI Reference Models; the role of standardization in network protocols.
2. The Application Layer (Selected topics): Basic services; qualities of service; network programming.
3. The Transport Layer: basic principles; reliable data transfer; pipelined protocols; connection management; flow control in the Transport Layer; the TCP and UDP protocols.
4. The Network Layer: service models; routing algorithms; routing in the Internet; the IP and IPv6 protocols; mobile IP.
5. The Data Link Layer and Local Area Networks: Data link functions; error detection and correction; multiple access protocols; TDMA, FDMA, and CDMA; CSMA, CSMA/CD and ALOHA protocols; Ethernet; hubs, bridges, and switches; 802.11 Wireless LANs.

Lecture Summary

1. Topic 1: Introduction: 6 lectures: Tue. Feb. 8, Thu. Feb. 10, Tue. Feb. 15, Thu. Feb. 17, Tue. Feb. 22, Thu. Feb. 24.
2. Topic 2: Application Layer: 2 lectures: Tue. Mar. 1, Thu. Mar. 3.
3. Topic 3: Transport Layer: 6 lectures: Tue. Mar. 8, Thu. Mar. 10, Tue. Mar. 15, Thu. Mar. 17, Tue. Mar. 22, Tue. Apr. 5.
4. Topic 4: Network Layer: 6 lectures: Thu. Apr. 7, Tue. Apr. 12, Thu. Apr. 14, Tue. Apr. 19, Thu. Apr. 21, Tue. Apr. 26.
5. Topic 5: Data Link Layer: 5 lectures: Thu. Apr. 28, Thu. May 5, Tue. May 10, Thu. May 12, Tue. May 17.

Note: There will be no class on Tue. Mar. 29 and Thu. Mar. 31 due to Spring Break.

First Mid-Term Exam: Thursday March 24

Second Mid-Term Exam: Tuesday May 3

Final Exam: Monday May 23, 1 - 3 pm.

Additional Reading:

1. **Internet Engineering Task Force:** This is the body responsible for developing the architecture of and protocols for the Internet. Its work is mostly done within Working Groups, and is initially published as Internet Drafts. All standards as well as some informational documents are published as RFCs (Request For Comments). All of these are accessible through IETF's web page:

<http://www.ietf.org>

2. *Computer Networks* by Andrew S. Tanenbaum. Upper Saddle River, NJ: Prentice Hall, 2003. Fourth Edition.
3. *Communication Networks: Fundamental Concepts and Key Architectures* by Alberto Leon-Garcia and Indra Widjaja. Boston, MA: McGraw-Hill, 2000.
4. *Computer Networks and Internets with Internet Applications* by Douglas Comer. Upper Saddle River, NJ: Pearson Prentice Hall, 2004. Fourth Edition.
5. *The Pocket Guide to TCP/IP Sockets, C Version* by Michael J. Donahoo and Kenneth L. Calvert. San Francisco, CA: Morgan Kaufmann Publishers, 2001.