

Syllabus

Handout 0

Jan. 14, 2009

Location: OHR 226 (Oliver H. Raymond Civil Engineering Building)
Time: MWF 2:00 pm - 2:50 pm
URL: <http://voip.netlab.uky.edu/~fei/teaching/cs471/index.html>

Instructor

Zongming Fei
Office: 227 James F. Hardymon Building
Phone: (859)257-3202
email: fei@cs.uky.edu

Office hours: MW 11:00 - 12:00 (or by appointment)

Textbooks

James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet (4th Edition), Addison Wesley, 2007. (required)
Michael J. Donahoo and Kenneth L. Calvert, TCP/IP sockets in C: Practical Guide for Programmers, Morgan Kaufmann, 2000. (recommended)

Description

Broad overview of networking concepts, with emphasis on data communications. Layered protocols. Analog and digital channel characteristics. Framing, error detection, error control, ARQ protocols. Network-layer functionality. End-to-end transport services. Client-server communications.

Prerequisite

CS-315 and engineering standing.

Needed Skills: Ability to design, code and debug nontrivial programs in C or C++. Some knowledge of computer hardware organization.

Learning Outcomes

At the conclusion of the course, the successful student will be able to:

1. Explain how information is encoded for transmission over digital channels. Explain the concepts of channel capacity ("bandwidth") and latency.
2. State and recognize the framing problem. Describe, apply and implement solution techniques.
3. State the fundamental paradigm of error detection, and evaluate error detection mechanisms for effectiveness under given conditions. Describe, apply, and implement parity-, checksum-, and CRC-based error detection.
4. Identify three different approaches to implementing a local area network, their advantages, disadvantages, and limiting parameters.
5. Explain the principles of operation of mail and web protocols.
6. Design, code, and test simple client and server programs that communicate via a network.

Grading

The grade will be determined by your performance on homework, lab and programming assignments, participation in class, a midterm exam and a final exam. The tentative weights are as follows:

Class participation	5%
Homework, Lab and Programming Assignments	45%
Midterm exam	20%
Final exam	30%

Lab assignments will use the *wireshark* tool to observe the network traffic. Programming assignments will implement some non-trivial client-server programs using both the multilab and UK Emulab.

Final grades will be assigned according to the following scale:

A=90-100%, B=80-89%, C=70-79%, D=60-69%, E=0-59%.

For graduate students, grade D will automatically be replaced by E. Also, any grade normalization will be done against peer students, i.e. undergraduates will only be normalized with undergraduates, and graduates with graduates.

No incomplete grades will be assigned unless there exist exceptional, extenuating circumstances.

Late programs or homework will be penalized 10% per day for each day late. No programs or homework will be accepted if they are late for more than 3 days. Attendance is mandatory. For each unexcused absence, two points will be deducted from your final average.

Additional Sources

The text will be supplemented with additional materials. Among them, RFCs (RFC stands for *Request for Comments*) will be used most frequently.

Here are some other textbooks:

- Behrouz A. Forouzan, TCP/IP Protocol Suite, Third Edition, McGraw-Hill, 2005.
- Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Fourth Edition, Morgan Kaufmann Publishers, 2007.
- Richard W. Stevens, TCP/IP Illustrated, Volume 1, Addison Wesley, 1994.
- William Stallings, Data and Computer Communications, Prentice Hall, 7th Edition, 2004.
- Douglas Comer, Internetworking with TCP/IP: Principles, Protocols, and Architecture, Prentice Hall, Third Edition, 1995.

Academic Conduct Expectations

Students are expected to do all assignments themselves, unless explicitly told otherwise. Honest and ethical behavior is expected at all times. There will be no tolerance for plagiarism or other academic misconduct. The minimum punishment is an E grade that cannot be removed by the repeat option. You may read U.K. Student Rights and Responsibilities at <http://www.uky.edu/StudentAffairs/Code> for a detailed description.

Schedule

This schedule is tentative and subject to change.

Please be advised that you are supposed to read the corresponding sections in the textbook and other listed materials before each class. Some of the contents will not be covered during the class meeting.

Week	Start from	Topic	Sections in the book
1	01/14	Introduction, Digital channels, delay, bandwidth	1
2	01/21	Network applications, HTTP	2.1, 2.2
3	01/26	FTP, SMTP, DNS, P2P	2.3, 2.4, 2.5, 2.6
4	02/02	Socket Programming	2.7, 2.8, and the second book
5	02/09	Transport layer, UDP, Reliability	3.1, 3.2, 3.3, 3.4
6	02/16	TCP, sliding window, flow and congestion control	3.5, 3.6, 3.7
7	02/23	Network layer, VC vs Datagram, routers	4.1, 4.2, 4.3
8	03/02	flexible and midterm	
9	03/09	IP forwarding and addressing	4.4
10	03/16	Spring Break	
11	03/23	Routing protocols	4.5, 4.6, 4.7
12	03/30	Link layer, error detection, framing	5.1, 5.2
13	04/06	MAC Protocols, Ethernet	5.3, 5.4, 5.5, 5.6, 5.7
14	04/13	Wireless and mobile networks	6
15	04/20	Multimedia Networking & Network Security	7, 8
16	04/27	flexible and review	
17		Final Exam at 8:00am on Friday (May 8)	