

Course Description

Handed out: September 6, 2005

Overview

This course will cover the basic principles of networking with a focus on protocols, implementations, and issues specific to the Internet. We will study how LANs, routing, transport, and various network protocols and applications work using a number of examples. The optional project will have groups of 4 students working on a large application for Internet traffic analysis and visualization.

General Information

Class Time: Tuesday and Thursday 1:00PM-2:15PM, in 1240 CSS.

Final Exam: Monday, December 19, 2005 2:45PM-4:45PM.

Instructor: Cristian Estan. Email estan@cs.wisc.edu. Office: CSS 7387.
Office Hours: Mondays 3-4, Wednesdays 9-10

Teaching Assistants: Shreepadma Venugopalan. Email vshree@cs.wisc.edu. Office: CSS 3379
Office Hours: Tuesdays 9-10, Wednesdays 2-3
Suresh Sridharan. Email suresh@cs.wisc.edu. Office: CSS 3385
Office Hours: Mondays 9-10, Thursdays 9-10

(Please include the text "CS640" in the Subject line when you send an email.)

Textbook: Computer Networks: A Systems Approach (3rd Edition) by Larry Peterson and Bruce Davie. Morgan Kaufmann, 2003. ISBN: 1-55860-832-X.

Each week I will specify relevant sections of the required text which I will cover in class. Other useful books:

- **Recommended:** TCP/IP Sockets in C: Practical Guide for Programmers by Michael Donahoo and Kenneth Calvert. Morgan Kaufmann, 2003. ISBN: 1-55860-826-5.
- **References:**
 - TCP/IP Illustrated, Volume 1 by W. Richard Stevens. Addison-Wesley. ISBN: 0-201-63346-9.
 - Computer Networking: A Top-Down Approach Featuring the Internet by Jim Kurose and Keith Ross, Addison-Wesley. ISBN: 0-201-61274-7.

Course Work

Syllabus: The following is the broad set of topics that will be covered in this course (roughly in the specified order):

1. Networking basics and protocol layering.

Grading criteria for the class		
Criterion	Assignment track	Project track
Comprehensive final exam	35%	
Class participation	5%	
Programming assignments	5+5+10+10=30%	N/A
Project milestones	N/A	10+10+10+10=40%
Quizzes	(best 6 of 7) = 30%	(best 5 of 7) = 25%
Total	100%	105%

2. Physical and Link layer — Framing, Checksums, Aloha, Ethernet, Token Ring, Wireless LANs, etc.
3. Routing — Distance Vector, Link State, etc., IP service model, Internet addressing.
4. Transport — UDP and TCP.
5. Network services and applications — DNS, HTTP, SMTP, MIME, FTP, etc.
6. Advanced topics — Overlays and P2P, Node mobility, Security, NATs and Firewalls.

Grading: The course will have a comprehensive final exam and biweekly quizzes. You will have to choose between working on a project or on programming assignments. The assignments will involve socket programming, and you will implement a simple client, a simple server, a routing protocol, and a reliable transport protocol. The project will require groups of 4 students to extend an Internet traffic analysis and visualization application developed by CS 640 students last Fall. This project will also give you a taste of “real-world programming”: it will involve a large application written by others, you will work in groups, the groups will have to agree on modularization and interfaces, you will have milestones to meet and bugs to fix.

The class participation component is to encourage you to voice your opinions, raise questions, and actively involve in discussions in the class and in the mailing list.

Mailing List: The class mailing list is `compsci640-1-f05@lists.wisc.edu`. It should be used for all course related discussions, e.g. assignments, projects, exams, or any topic related to networking. If you have questions about assignments, projects, etc. please post them to the mailing list before writing emails to the TA or the instructor.

Prerequisites: CS 537 or consent of instructor.

Collaboration and Academic Honesty: You may *discuss* programming assignment problems for general solution strategies with your classmates. But the formulation and exposition of the solutions *must* entirely be your own. The people working on projects will hand in a single report per team, but the report should give details about the contributions of individual team members.