Instructor

Craig E. Wills, FL-236, cew@cs.wpi.edu. Office hours: TBD; any time for short questions. Electronic mail is an effective method to contact me.

Course Web Page

Copies of all handouts, assignments, notes and old exams will be posted as appropriate on the course Web page. The address for it is `http://www.cs.wpi.edu/~cs513/s07/`.

Paper copies of handouts and assignments will be given out when assigned. Copies of course notes will not be handed out, but will be available online after the lecture in which they are used.

Purpose

This course is an introduction to computer networking. It covers protocol design principles, performance considerations, and networking technologies. The goals are 1) to provide students with a broad theoretical and practical base in computer communication issues by considering all protocol layers involved in process-to-process communication, 2) to introduce students to the design issues and tradeoffs that arise in building and using networks for interprocess communication, and 3) to give students "hands on" experience with building and using network services.

Expected Background

A strong desire to learn about computer networking and programming experience with one conventional programming language (e.g., C, C++, Java, etc.). Systems programming background is desirable as programming projects will involve writing programs to do network communication. Students without this background are expected to acquire it on their own. Probability and some calculus will be needed when we study data transmission and physical layer technologies as well as analyze network performance.

Text Books

Required:
    Computer Networks (4th Edition), by Andrew Tanenbaum, Prentice Hall, 2002.
Reference:
    Data and Computer Communications (8th Edition), by William Stallings, Prentice Hall, 2007.

Communication Networks, by Alberto Leon-Garcia and Indra Widjaja, McGraw Hill, 2000.

Computer Networks: A Systems Approach (3rd Edition), by Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann, 2003.

Computer Networks and Internets with Internet Applications (4th Edition), by Douglas E. Comer, Prentice Hall, 2004.

Grading Policy

Final grades will be computed as follows:

Midterm Exam: 30%;

Final Exam: 30%;

Homework, projects, quizzes, and class participation: 40%.

Grading policy for each project and homework will be provided at the time of the assignment. Final grades will reflect the extent to which you have demonstrated understanding of the material, and completed the assigned projects. No incomplete grades will be assigned unless there exist exceptional, extenuating circumstances.

- **Programming Assignments**

  There will be 2-3 programming assignments. Assignments will involve programming in C/C++ on the Unix systems, and generally be done individually by each student. Students are assumed to be competent in a high-level programming language such C/C++ and the Unix operating environment. Specific Unix routines dealing with networking will be introduced as the course progresses and programming projects are assigned.

  Unless otherwise agreed upon with the instructor, assignments will be done on the WPI CCC/CS/ECE machines. You will also be introduced to system calls pertinent to network programming as the course progresses.

- **Exams and Quizzes**

  There will be two in-class exams (including a final exam during the last class period), plus the possibility of pop quizzes for which no advance notice will be provided. Exams will be closed book, closed notes.

- **Written Homeworks**

  There will be 2-3 written homework assignments. Written assignments consist of problems from the book, made up problems, or readings from the research literature.

Late Policy

Each homework and programming assignment will be given a point value when it is handed out. The point value indicates the weight of the assignment relative to the other assignments. Late programs and homeworks will be be penalized 5% of total assignment value per day or partial day, and no assignments will be accepted after seven days beyond the due date. All programs and written homeworks are due at the *start* of class on the due date. Homeworks and programs turned in after the start of class will be counted late. Projects will be submitted

as directed in class. Exceptions to these rules can be made only *a priori*. Finally, no assignments will be accepted after the last day of class to allow sufficient time for grading.

Cheating

Unless explicitly noted, all work is to be done on an individual basis. Any violation of the WPI's guidelines for academic integrity will result in a failing grade for the course and referral to the Student Affairs Office for disciplinary action.

Schedule

The following is a tentative outline of the material that will be covered in this course. References to chapters from Tanenbaum's book are given for each topic. Other references will also be used for lecture material.

week 1: 1-15. Course introduction and overview. Tanenbaum: Chapter 1.

week 2: 1-22. Physical layer. Tanenbaum: Chapter 2.

week 3: 1-29. Physical layer (cont). Data Link Layer. Tanenbaum: Chapters 2, 3.

week 4: 2-5. Data Link Layer (cont). Tanenbaum: Chapter 3.

week 5: 2-12. MAC Layer Tanenbaum: Chapter 4.

week 6: 2-19. MAC Layer (cont). Network layer. Tanenbaum: Chapters 4, 5.

week 7: 2-26. Midterm exam.

week 8: 3-5. No Class (tentative week off).

week 9: 3-12. Network layer (cont.) Tanenbaum: Chapter 5.

week 11: 3-19. Internetworking.

week 10: 3-26. Transport layer. Tanenbaum: Chapter 6.

week 12: 4-2. Transport layer (cont). Tanenbaum: Chapter 6.

week 13: 4-9. Application layer. Tanenbaum: Chapter 7

week 14: 4-16. Application layer (cont). Tanenbaum: Chapter 9.

week 15: 4-23. Final exam.