CS 446/646 Computer Communications and Networks
Spring 2018 Syllabus (tentative)

Class room & time: M03-0201C, TuTh 12:30PM-1:45PM
Instructor: Prof. Duc A. Tran, S-3-176, (617) 287-6452, duc.tran@umb.edu

Objectives

A successful student will be *comfortably* able to

- understand the history, evolution, and trends of today's computer networks
- understand fundamental networking architectures and protocols
- conduct an independent study in the area of computer networks
- improve research skills (critical thinking and problem solving)
- improve communication skills (technical writing and presentation)

Topics

CS 446/646 is the introductory course in computer networks offered to both undergraduate (course number CS446) and graduate students (course number CS646). There are two parts. First, we review the Internet and its underlying technologies. Second, we focus on emerging networking concepts and challenging problems that relate to modern networks. The following topics are covered:

- Introduction: History of Computer Networks and the Internet, introduction to key concepts and terminology, overview of the Internet protocol stack
- Application Layer: Principles, the Web and HTTP, FTP, electronic mail, domain name service
- Network Programming and Simulation: Develop network applications using Socket Programming with C/C++ (or JAVA)
- Transport Layer: TCP/UDP, reliable data transfer, congestion control
- Network Layer: Virtual-circuit and datagram networks, router design, routing algorithms (unicast, multicast, broadcast), the Internet Protocol (IP)
- Link Layer: Error handling techniques, multi-access protocols, link-layer addressing
- Wireless and mobile technologies
- Network security
- Special topics (if time permits): Discussion of select emerging topics
    - Blockchain networks
    - Cloud computing, mobile edge computing
    - Sensor networks, Internet of Things
    - Multimedia networking, content distribution networks

Prerequisites

- CS444 Introduction to Operating Systems (maybe waived by instructor depending on qualifications)
- Programming experience in at least one programming language

Textbook

- Required textbook: Computer Networking: A Top-Down Approach. *Jim Kurose and Keith Ross*. The latest edition is recommended but earlier editions are OK.
- Recommended reading: Computer Networks. *Andrew S. Tanenbaum*. 5th ed.

Grading

- Homework (10% of final grade): There will be 2 problem-solving assignments, each worth 5%
- Test 1 (15% of final grade): In-class, open-book.
- Test 2 (15% of final grade): In-class, open-book, covering topics after Test 1.
- Final (20% of final grade): In-class, open-book, covering topics after Test 2.

- Presentation (20%): Each student is individually required to read a research paper about communications and networking and present it before the class. Each presentation is 20 minutes of talk and 5 minutes of Q&A.
- Project (20% of final grade): This is a term project, assigned to groups of two. Each team will investigate an issue related to networking; for example, setting up a smartphone surveillance system or implementing an indoor localization system. The expected result, due by the end of the course, will be a final product, a summary report describing the development process and the product, and a team presentation. The assignments will be posted on the course website.
- Class attendance: For each class meeting you miss, you will lose 2 points off your overall score. Personal computer/phone use is NOT allowed during class section.

Late Homework and Makeup Policies

Unless a good reason and its supporting evidence are given, e.g., due to illness, emergency, important events:

- No makeup is acceptable for students missing a homework assignment or an exam.
- Homework may be submitted late by no more than 24 hours, weekend and holiday counted. The penalty for late submission is 10% of the homework score.

Accommodations

Section 504 of the Americans with Disabilities Act of 1990 offers guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center for Disability Services, M-1-401, (617-287-7430). The student must present these recommendations and discuss them with each professor within a reasonable period, preferably by the end of Drop/Add period.

Student Conduct

Students are required to adhere to the University Policy on Academic Standards and Cheating, to the University Statement on Plagiarism and the Documentation of Written Work, and to the Code of Student Conduct as delineated in the catalog of Undergraduate Programs, pp. 44-45, and 48-52. The Code is available online at: http://www.umb.edu/student_services/student_rights/code_conduct.html

Additional information

My emails to the class will be sent from the WISER system so make sure that your email address is set up correctly with WISER. You should visit the website regularly for other information including latest announcements about the class.