

ECE-1458: Computer Communications Networks

Spring Quarter 2003 Course Syllabus

Basic Information

Course	: ECE 1458 - Computer Communications Networks
Quarter	: Spring 2003
Meetings	: Tue, Wed, Fri 11:45 am - 12:50 pm
Classroom	: Northeastern University Boston Campus
Instructor	: Prof. A. Bruce McDonald (mcdonald@ece.neu.edu)
Office Hrs	: Wed 3:00 - 5:00 pm (or by appointment)
Office	: 417 Dana
Phone	: 373-3028
WWW Site	: www.ece.neu.edu/courses/ece1458/2003sp
Teaching Assistant	: TBA

Course Description

The objective of this course is to provide students with a basic understanding of challenges faced in the design and analysis of modern digital communications networks. The emphasis is on fundamental concepts related to the design of reliable end-to-end communications systems and draws substantially on practical examples using present day systems ranging from first, second and third generation local-area-networks (LAN) to the evolution of the Internet (TCP/IP), high-speed networking technologies (ATM) and emerging wireless public access and local networks. The concept of layered network architecture is used as a framework for understanding the principle functions and services required to achieve reliability, as defined with respect to application service requirements. Service interfaces and peer-to-peer protocols are explained within the context of the ISO (International Standards Organization) model of Open-Systems Interconnection (OSI); the philosophy of the 'defunct' OSI seven-layer model is compared to the DoD (Internet) framework and IEEE LAN architecture. Topics include basic aspects of data communications, multiplexing and switching modes, mechanisms for reliable transmission across a data-link, such as, error-detection and automatic-retransmission request (ARQ), media-access-control, addressing, routing, flow control and performance analysis.

Course Material

The required textbook is: "Networks for Computer Scientists and Engineers" by Youlu Zeng and Shakil Akhtar, published by the Oxford University Press, 2001. A partial compilation of lecture presentation material from the text shall be made available for download from the class web—students are advised to print the view-graphs and bring them to class to avoid unnecessary note taking. In addition to the text students will be using a software system called **OPNET** by *Mil-3* to "model" several basic network functions using "simulation".

Course Schedule

Class meets three times each week for approximately one hour (11:45 - 12:50) in 153 Ryder. The lecture material shall follow approximately from the text; however there will be some material covered in lecture that is not in the text, and, there will be material in the text that students are responsible for that time does not permit detail coverage during lecture. Hence, students are strongly advised to both attend the lectures and carefully read the assigned chapters from the text. The following schedule indicates the source of material covered in each lecture based upon chapter number in the Zeng text; plan your readings accordingly—the specific sections covered each day will vary and there will be some deviation from this schedule. The due dates for each homework assignment are as indicated; each assignment will be given out on the previous week. Homework will consist of problems from the text and some basic simulation models using **OPNET**.

Week #1	Wed, March 26	: Fundamentals	Introduction	Ch-1	
	Fri, March 28	: Fundamentals	Introduction	Ch-1	
Week #2	Tue, April 1	: Fundamentals	Data Communications	Ch-2	
	Wed, April 2	: Fundamentals	Data Communications	Ch-2	
	Fri, April 4	: Fundamentals	Data Communications	Ch-2	
Week #3	Tue, April 8	: Fundamentals	Network Architectures	Ch-3	HW #1 due
	Wed, April 9	: Fundamentals	Network Architectures	Ch-3	
	Fri, April 11	: Fundamentals	Network Architectures	Ch-3	
Week #4	Tue, April 15	: Fundamentals	Network Architectures	Ch-3	HW #2 due
	Wed, April 16	: Fundamentals	Local-Area Networking	Ch-4	
	Fri, April 18	: Fundamentals	Local-Area Networking	Ch-4	
Week #5	Tue, April 22	: Fundamentals	Local-Area Networking	Ch-4	HW #3 due
	Wed, April 23	: Fundamentals	Local-Area Networking	Ch-4	
	Fri, April 25	: Midterm Exam	Covers:	Ch 1-4	
Week #6	Tue, April 29	: TCPIP	Internet Technologies	Ch-5	HW #4 due
	Wed, April 30	: TCPIP	Internet Technologies	Ch-5	
	Fri, May 2	: TCPIP	Internet Technologies	Ch-5	
Week #7	Tue, May 6	: TCPIP	Internet Technologies	Ch-5	HW #5 due
	Wed, May 7	: Broadband	High Speed Networks	Ch-6	
	Fri, May 9	: Broadband	High Speed Networks	Ch-6	
Week #8	Tue, May 13	: Broadband	High Speed Networks	Ch-6	HW #6 due
	Wed, May 14	: Broadband	High Speed Networks	Ch-6	
	Fri, May 16	: Switching	Switching Systems and VLANs	Ch-7	
Week #9	Tue, May 20	: Switching	Switching Systems and VLANs	Ch-7	HW #7 due
	Wed, May 21	: Switching	Switching Systems and VLANs	Ch-7	
	Fri, May 23	: Switching	Switching Systems and VLANs	Ch-7	
Week #10	Tue, May 27	: Queuing Theory	Network Performance	Ch-8	HW #8 due
	Wed, May 29	: Queuing Theory	Network Performance	Ch-8	
	Fri, May 30	: Queuing Theory	Network Performance	Ch-8	
Exam Week		: Final Exam	Covers:	Ch 1-8	

The first day of class is Wed, March 26; the last day of class is Fri, May 30. The midterm is currently scheduled for Fri, April 24; the most likely alternative date would be Fri, May 2; the final exam date is TBA. The last day to drop without receiving a 'W' is April 11; the last day to withdraw from the course is May 16.

Course Evaluation

Course evaluation shall consist of eight (8) graded homework assignments, a one-hour midterm exam and the final examination. The weight given to each of these components with respect to the overall course grade is indicated below. A linear grading scale will be used to convert raw scores into letter grades; to earn the grade of 'A' the student must demonstrate mastery of the material and consistency of effort. A grade of 'B' or better indicates very good to excellent performance—there are no pre-determined bounds on the number of any given grade; each student will receive the grade he or she earns.

Home-works	: 30%
Midterm Exam	: 30%
Final Exam	: 40%

Honors Program:

Course Policies

- Students are expected to complete all the course assignments and master the course material; class attendance is not mandatory, however, it is highly recommended.
- Students are expected to come to class prepared; as such you are expected to read the material associated with each lecture prior to the lecture.
- Homework assignments must be turned in on-time to receive credit; late home-works will not be accepted—assignments are to be submitted at the start of class on the due date.
- Homework assignments must be neat and legible with all steps and parts clearly identified; use standard 8½ x 11 in. paper with problems in order and pages stapled together (typeset is preferred, but not required).
- All students must be present for and take the midterm and final exams at the scheduled dates and times; exceptions will be given for verifiable emergencies, or under extreme circumstances and, then, only if permission is granted by the instructor in advance of the date of the exam.
- Students are expected to adhere to University academic integrity policy; students are encouraged to work together on homework assignments, however, copying from another and presenting it as your work is a fraudulent act—any student who violates this policy will receive a grade of 'F' for the course.
- Questions regarding grading are to be directed as follows: For homework queries contact the TA. If a dispute cannot be resolved, please setup an appointment to see me via email; for midterm related queries please setup an appointment to see me via email; for final grades please send email to me *after* the start of Spring Quarter in order to schedule an appointment.
- Please feel free to discuss with me any problems you are having with the class—I appreciate any feedback that you have that can improve the course now or in the future.