Northwestern University

Department of Electrical and Computer Engineering

ECE 333: Introduction to Communication Networks Fall 2002

Information Sheet:

Instructor:
Prof. Randall Berry
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Office Hours: Mon., 3-5pm. Or by appt.

Teaching Assistants:
Naveen Arunselvan and Wei Guo
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Office Hours: Tues. 5-7pm, Room MG14.

Time and Place: MWF 2:00pm - 2:50pm, Room L221 Tech.

Prerequisites:

ECE 302, IEMS 302, Math 330, or equivalent course covering basic probability theory. This is a necessary prerequisite - if you are not comfortable with basic probability, you should not except to learn it here.

Text:

- Course lecture notes – available on the website.
- Alberto Leon-Garcia and Indra Widjaja, *Communication Networks –Fundamental Concepts and Key Architectures*, McGraw-Hill, 2000.

The majority of the material in the course can be found in the lecture notes. Much of this is also covered in the book – appropriate sections of the book will be listed on each problem set.

Course Overview:

This course provides an introduction to communication networks, such as the Internet and the public telephone network. The primary goal is to develop a conceptual framework for understanding the issues that must be addressed by modern networks. Specific topics to be covered include layered network architectures, error recovery and retransmission (ARQ), medium access control, routing and addressing, resource allocation and quality of service.

Course Website: *http://www.ece.nwu.edu/~rberry/ECE333/*

Handouts and homework assignments not picked up during class will be available on the website. Any important announcements will also be posted here – so check this page often!

Problem Sets:

There will be approximately 8 problem sets, corresponding to a quasi-weekly schedule. You are expected to do all the assigned problems; when making up the exams, we will assume that you have worked all the problems. Working together in small groups on the problem sets is encouraged; however, each person should write up their own solution to hand in. The problem sets are intended to help you learn the material -- whatever maximizes learning for you is desirable. This, of course, does not include copying solutions from other students or other sources – this is considered an act of academic dishonesty and will be dealt with accordingly.

Problem sets must be handed in by the end of the class in which they are due. Late problem sets will not be accepted.

Exams:

There will be one mid-term exam in class on Wed., October 30 and one final exam during the scheduled final exam period. You may bring two pages of handwritten notes on size 8.5x11 paper to the midterm and four pages to the final.

Course Grade:

Your final grade in the course is based upon our best assessment of your understanding of the material. The weightings used to determine the final grade are:

Midterm	35%
Final	45%
Problem Sets	20%

Reference Texts:

The following texts are written at an introductory level, similar level to this course:

- Andrew Tanenbaum, *Computer Networks*, 3rd Ed., McGraw-Hill, 1998.
- J. Kurose and K. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, Addison Wesley, 2001.
- L. Peterson and B. Davie, *Computer Networks: A Systems Approach*, 2nd Ed., Morgan Kaufmann, 2000.
- W. Stallings, *Data and Computer Communications*, 6th Ed., Prentice Hall, 2000.
- J. Walrand, *Communication Networks: A First Course*, 2nd Ed., McGraw-Hill, 1998.

At a more advanced level, the following are good references:

- D. Bertsekas and R. Gallager, *Data Networks*, 2nd Ed., Prentice Hall, 1992.
- J. Walrand and P. Varaiya, *High-Performance Communication Networks*, 2nd Ed., Morgan Kaufmann, 2000.

Syllabus (tentative):

The following topics will be covered:

1. Introduction – examples of communication networks, trends in networking.
2. Layered Architectures – standard interfaces, OSI and TCP/IP reference models.
3. Physical Layer – channel impairments, fundamental limits, characteristics of common physical layers.
4. Data Link layer – framing, error detection/correction, ARQ protocols and performance.
5. Delay models – sources of delay, Little's Law, Poisson process, M/G/1 queue.
6. Medium Access Control – Aloha, Ethernet, token ring, wireless LANs, bridges.
7. Switching and Multiplexing – circuit switching, packet switching, time-division and statistical multiplexing, switch architectures, public telephone network.
8. Routing and Addressing – Dijkstra's Algorithm, Bellman-Ford, IP routing and addressing.
9. Transport Layer – connection set-up/teardown, congestion control, flow control, TCP and UDP.

Student Information:

Name:_____.

Graduate or Undergraduate:_____.

Department/Area_____.

(Undergraduates list sub-area such as computer engineering or electrical engineering. Graduate students list research area.)

Indicate which of the following courses you have taken:

ECE 302 or equivalent introduction to probability.

ECE 307 or other introduction to communication.

Other networking courses (specify).

Briefly describe any previous knowledge/background relating to communication networks:

Briefly state what you hope to learn in this course: