

CMPE 150

Introduction to Computer Networks

Spring Quarter 2003

6:00 – 7:45PM, Tuesday/Thursday, Baskin Engineering RM 152

Spring Quarter 2003

Course focus:

This courseThe main topic of our course is an introductory look at computer communication. We focus on the principles of computer communication, rather than on the specific technologies being used in computer networks and the Internet today. The main questions we will be trying to answer over and over are:

- Why is it that we can be (relatively) sure that a protocol works ``correctly"?
- How do we go about designing new protocols?
- What is a good protocol and what are good examples of such protocols?
- To a lesser extent: How good is the performance of the protocol?

We will discuss very little about the ``physical layer" of networks, and focus on the protocols used on top of the hardware layer. In a way, you can think of this class as designing and analyzing distributed algorithms aimed at communication through computers.

You should be warned that the course is introductory in the depth of its treatment of both theory and practice. Our hope is that you will develop an understanding of how to think about designing and analyzing communication protocols. Beyond this, you will need a lot of reading on your own to grasp the details of current practice in computer networks, as well as to be able to tackle complex design and analysis problems. Other courses in the networks track (CMPE 151, CMPE 152, CMPE 154, and CMPE 155) build on the basic concepts introduced in this course to address the physical layer of data communication, the performance analysis of communication protocols, and a hands-on treatment of network administration.

Because of the short duration of our course, we can only discuss a few of the very many protocols used or proposed to date. We believe that what we will cover will be a good way to get you started in this increasingly important area of computer science and engineering. We will emphasize protocols for the IP Internet, simply because it is the wave of the present and future in internetworking.

Prerequisites:

CMPE16, CMPE12C/12L (see your advisor for clarification)

Textbooks:

James Kurose and Keith Ross, Second Edition, *Computer Networking*, Addison Wesley, 2002 (ISBN 0-201-97699-4).

The textbook is an introductory book that you will find very useful, because it is very recent and focuses on the Internet, which is the focus of our course. The book covers more topics than we can cover in one quarter, and does not spend as much time in analyzing the principles of the protocols it covers. The lectures will complement the book in the analysis area.

The book follows a top-down approach to the subject, including the protocol layers discussed. By contrast, we cover the topics top down as well, but address the lower-layer protocols first and work our way to the application layer. Lower-layer protocols are simpler than protocols at the network layer and make fewer assumptions; in addition, they render themselves to simple analytical modeling.

Other books that may be of interest to you are:

- A. Tanenbaum, *Computer Networks*, 3th edition, Prentice-Hall, 1996.
- Douglas Comer, *Internetworking with TCP/IP*, 3th edition, Prentice-Hall. Multiple volumes.
- W. Richard Stevens, *TCP/IP Illustrated*, Vol. 1 and 2, Addison Wesley, 1994.
- You will probably want to read this or Comer's Vol. 1 and 2

You should review concepts of discrete probability from the textbook you used in CE16. The book *Discrete Mathematics and its Applications* by Kenneth Rosen, McGraw-Hill, is a good source.

Instructor:

Dr. Chane L. Fullmer

Office: Baskin Engineering 399F (Inside BE399 – The CCRG Lab)

Office Hours: Tuesday/Thursday 5:00 – 6:00PM (by appointment only)

Class email: chane@soe.ucsc.edu

TA:

Venkatesh Rajendran – venkat@soe.ucsc.edu

Class Webpage: www.soe.ucsc.edu/classes/cmpe150/Spring03

Course Evaluation:

This course evaluation will be based on the

Grading: The grades achieved will be assigned as follows:

<i>Grade</i>	<i>Score</i>
A	90 – 100%
B	75 – 89.99%
C	60 – 74.99%
Fail	< 60%

Assignments:

- Homework
 - There will be five homework assignments – see course schedule for due dates
- Midterm examination
 - There will be one midterm exam
 - April 29 -- in class
 - Requires Scantron Form F-1712-ERI-L (pink) and #2 pencil
- Final examination
 - The Final will be comprehensive and will take place
 - June 11 @ 8AM to 11AM
 - Requires Scantron Form F-1712-ERI-L (pink) and #2 pencil

Final grade will be weighted as follows:

Homework	40%
Midterm	30%
Final	30%

TENTATIVE COURSE SCHEDULE:

NOTE: This schedule may change during the quarter – changes will be announced in lectures.

1. Apr 1 (T) **Class Objectives, Overview, Structure, Assignments and Grading**
 - Read and clearly understand the class syllabus, the organizational structure of the book, the course assignments and the due dates.
2. Apr 3 (Th) **Introduction & background**
 - Read Chapter 1
3. Apr 8 (Tu) **Medium Access Control (MAC)**
 - Read Chapter 5
4. Apr 10 (Th) **MAC – cont**
5. Apr 15 (Tu) **MAC – cont**
6. Apr 17 (Th) **MAC – cont**
7. Apr 22 (Tu) **Link Control**
8. Apr 24 (Th) **Link Control – cont.**

Apr 29 (Tu) ----- **midterm** -----
Bring Scantron Form – and #2 pencil

9. May 1 (Th) **Routing**
 - Read Chapter 4
10. May 6 (Tu) **Routing – cont**
11. May 8 (Th) **IP Networking**
12. May 13 (Tu) **IP Routing**
13. May 15 (Th) **IP Multicast**
14. May 20 (Tu) **IP Mobility**
15. May 22 (Th) **End-To-End (TCP & UDP)**
 - Read Chapter 3
16. May 27 (Tu) **ETE cont.**
17. May 29 (Th) **Application Level (HTTP, DNS)**
 - Read Chapter 2
18. Jun 3 (Tu) **Application layer – cont.**
19. Jun 5 (Th) **Review**

Final –

June 11, 2003 – 8:00 to 11:00 AM
Bring Scantron Form F-1712-ERI-L (pink)
and #2 pencil
[no make-ups – no rescheduling possible]