

Syllabus  
CSI 416/516 Computer Communications Networks  
Department of Computer Science  
University at Albany  
Fall 2004

William A. Maniatty

## 1 Staff and Contact Information

	Instructor	Teaching Assistant
Name	William A. Maniatty	Xingmin Luo
Office	LI 95E	LI 96P
Office Hours	T-Th 10:30-11:30	M-W 12:30-3:00
e-mail:	<a href="mailto:maniatty@cs.albany.edu">maniatty@cs.albany.edu</a>	

Please come during office hours or make an appointment (preferably via e-mail).

## 2 Readings

Most readings will be from text books, some readings from the current literature (e.g. conferences, IETF reports and/or journals) may be required as well.

- Required Texts:

- *Communications Networks: Fundamental Concepts and Key Architectures*, Leon-Garcia and Widjaja, McGraw Hill, 2003.
- *The Practical Performance Analyst: Performance-by-design Techniques for Distributed Systems*, Neil J. Gunther, IUniverse, 2000.

- Recommended Texts:

- *Unix Network Programming: Networking Apis: Sockets and Xti (Volume 1)*, W. Richard Stevens, Addison Wesley, 1997.

Additional information is on line at: <http://www.cs.albany.edu/~maniattb/teaching/networks>.

### 3 Preparation required for this Course

This is a programming intensive course, you are expected to be proficient in programming in C (for some assignments C++ may also be acceptable). **You will be expected to design, implement, and debug your own software.** There is also a theoretical/analysis component which presumes a basic knowledge of data structures, computer architectures, operating systems, digital logic, probability and calculus.

### 4 Some Additional Resources

Some good books for a qualitative look at networking include Tannenbaum's [7] and Comer [2] for a qualitative architectural approach (including logic design). Halsall [3] gives a more quantitative overview of network design. Peterson and Davie [5] provide an interesting alternative approach to computer networks. Stallings [6] and Black [1] provide an overview of high performance network architectures. Keshav [4] provides an interesting approach to network systems design issues at a somewhat advanced level.

### 5 Course Overview

This course introduces students to the basic concepts of computer networks design and its impact on systems performance, including:

- Network Layers,
- Physical and Data Link layer issues,
- Interconnection Technology,
- Systems software support,
- Performance analysis and tuning,
- Protocol designs (and associated trade-offs),

This course assigns equal weight to examinations and projects/homework. Several network architectures will be compared and contrasted, including the ATM, TCP/IP and the telephone network. Architectural support for systems software and applications will also be considered.

### 6 Course Policies

1. **Grading** — The grades will be on a A,A-,B+,B-,C+,C,E scale for graduate students. Enrolled undergraduate students can get grades of D+, D and D-.The breakdown is:

Grade	Minimum Percentage
A	93
A-	90
B+	87
B	83
B-	80
C+	77
C	70
D+	67
D	64
D-	60

2. **Exams** — There are two exams, a midterm and a final, each exam will count 25% of the course grade.
3. **Projects** — The assignments/projects will be worth 10% each and comprise 50% of the course grade.
4. **Homeworks** — There are no graded homeworks, however the instructor may provide in class exercises and assign problems from the text book to assist in reviewing the material and exam preparation.
5. **Contact outside of Class** — You should make an appointment to meet with the teaching assistant or professor outside of office hours (preferably via e-mail). Please respect our need to work, and try to avoid unscheduled drop ins outside of office hours (there are many of you, so the “quick questions” can cause problems).
6. **Grading Gripes** — All requests for grade changes should be made within 1 week of the original grading to the TA first (you may appeal to the professor if you don’t get satisfaction). Exams needing regrading should be given handed back to the instructor before leaving the class room. Factual errors, like incorrect point totals, or having a correct solution marked as incorrect are likely to result in an increased grade, but beware of frivolous complaints which can result in a grade reduction.
7. **Late submissions** — **Projects are due at the start of the class on the due date.** It is possible to underestimate the amount of time it takes to do a project. However, missed deadlines cause serious inconveniences in the real world (and to graders in academia). Deadline changes are at the discretion of the instructor.
8. **Make Up Exams** — Make up exams will only be given if the instructor is given *sufficient advance notice* and with proper documentation.
9. **Errata** — We try to get the course materials correct, students who help to find and fix errors in the course materials may get extra credit.
10. **Academic Honesty Policy** — All work submitted must be your own, and you are expected to do home works independently. If you need help with the materials or an assignment contact the TA or the instructor, we will help. **We take academic integrity seriously here and reserve the right to apply any and all penalties described in the University guidelines.**

## 7 Schedule

*This schedule is tentative and might be subject to change.*

Week	Topics	Readings	Notes
1.	Intro. to Networking. Layered Architectures	L1 L2	
2.	Intro. To Sockets The Physical Layer	L2 S3-5 L3, L12.1-12.3	HW1 Assigned
3.	Intro to Performance Analysis Queueing Systems	G1 L Appendix A, G2-3 ,31	HW1 Due HW2 Assigned
4.	Self Similarity Transmission Systems	L Appendix A, L3	
5.	Multiplexing and Switching The Telephone Network	L3 L4, G13	
6.	Intro to The Internet	L8	HW2 Due
	Mid Term Exam		
7.	Peer to Peer Protocols Link Sharing with Packet Mux	L5	HW3 Assigned
8.	LANs and MAC Channelization.		L6
9.	Intro to Packet Switching Addressing and Routing	L11	HW3 Due HW4 Assigned
10.	Routing Continued Scheduling and QoS	L12 L13	
11.	Congestion Control TCP/IP revisited	L14	HS4 Due HW5 Assigned
12.	Network Security		L11
.	Special Topics		L10
13.	Student Presentations		HW5 Due
	Final Exam and Vacation!		

Schedule for Computer Networks, G denotes Gunther, L denotes Leon-Garcia and Widjaja Chapters

## References

- [1] U. Black. *merging Communications Technologies*. Prentice Hall, Englewood Cliffs, NJ USA, 2 edition, 1997.
- [2] D. E. Comer and R. E. Droms. *Computer Networks and Internets*. Prentice Hall, Englewood Cliffs, NJ USA, 2 edition, 1999.
- [3] F. Halsall. *Data Communications, Computer Networks and Open Systems*. Addison Wesley, Reading, Massachusetts, USA, 4 edition, 1996.
- [4] S. Keshav. *An Engineering Approach to Computer Networking: ATM Networks, the Internet and the Telephone Network*. Professional Computing Series. Addison Wesley, Reading, MA, 1997.
- [5] L. L. Peterson and B. S. Davie. *Computer Networks: A Systems Approach*. Morgan Kaufmann, San Francisco, CA, USA, 1 edition, 1996.
- [6] W. Stallings. *High Speed Networks: TCP/IP and ATM Design Principles*. Prentice Hall, Englewood Cliffs, NJ USA, 1 edition, 1997.
- [7] A. S. Tannenbaum. *Computer Networks*. Prentice Hall, Englewood Cliffs, NJ USA, 3 edition, 1996.