

CSCI 6345
ADVANCED COMPUTER NETWORKS
Syllabus for Spring 2014

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ALL STUDENTS: PLEASE SUBMIT ASSIGNMENTS IN A MANILA FOLDER

CSCI 1201.09	MW 11:45-12:35 ASB 2.110		
CSCI/CMPE 1380 Comp Networks	MWF 9:45-10:35 Eng 1.250		
CSCI 6345.01	Tu 5:45-8:25 Eng 1.268		
Office Hours	MWF 10:35-11:35 am Tu: 1-3pm	Please follow University Policies for dropping a class. No exceptions.	Jan 13: first day of classes Holidays: Jan 20, Apr 19 March 9-14 Break Study days May 1-2 Final Exams May 3-9

Required Textbook: Comer, Douglas E., Computer Networks and Internets, 5th Edition, Prentice Hall, 2009. ISBN-0-13-606127-3 (ISBN 13: 978-0-13-606127-4)

Reference:

- Behrouz A. Forouzan, TCP/IP Protocol Suite, 4th Ed., McGraw Hill, 2010. ISBN 978-0-07-337604-2
- Tanenbaum, A. S., 2002, Computer Networks, 4th Ed., Prentice Hall, Upper Saddle River, New Jersey.
- *Data and Computer Communications* 7th edition, by William Stallings, Prentice Hall, 12004
- *UNIX Network Programming* by W. Richard Stevens, Prentice Hall, 1990

Expected Background:

Students are expected to be able to program in C or ++, VB or Java. Students who are not fluent in these topics should make up the deficiencies by homework and

programming exercises.

Catalog description:

In-dept study of theory, design, implementation and performance of computer and communications networks. Current network types, including point-to-point, satellite, packet switch, local area and wide area networks, are studied, as well as evolving technologies such as ATM. Provides an introduction to queuing analysis and includes network programming projects. Prerequisite: CSCI 6300, CSCI 4345 or equivalent, or consent of instructor.

Course Topics:

Fundamentals of computer networks; theory, design, implementation and performance analysis of computer networks; network protocols; examples of computer network applications.

Grading:

Midterm and final exams	40%
Project (pair of students)	20% (5% for presentation, 5% written report,
10% for quality of project)	
Weekly Assignments	20%
Programming assignments (2)	10%
Group Assignments (3)	10%

COURSE OBJECTIVES: Upon conclusion of this course a student will be able to plan and install a TCP/IP protocol stack based local area network, set up switches and routers, and write socket programs for communication.

Learning outcomes:

1. Compare and contrast the OSI and TCP/IP models.
2. Given a network problem, create appropriate topology and draw wiring diagrams.
3. Make cat 5 cables and connect them with switches and make crossover cables where appropriate.
4. Configure servers, switches and routers.
5. Create subnets and supernets.
6. Create routing tables.
7. Setup static IP address as well as DHCP based addresses.
8. Setup a DNS.
9. Setup a mail server
10. Setup a wireless network
11. Install appropriate network security
12. Write socket programs in C or Java.

Assignments:

General instructions about programming: You may choose any of the following languages: C, C++, Java, Visual Basic. If you would like to use another language please talk with me first. I

will not give you any assistance with the programming assignments. You are welcome to talk with others in the class to get general ideas and algorithms, but may not view their source codes. Assignments are due at the beginning of the class. Late penalties: 1 day=10%, 2 days=20%, 1 week=30%, 2 weeks=50%, after two weeks I do not accept assignments.

General instructions about the project: Start working on the research right away. Submit a topic for approval by the 2nd week. All research should be completed by the middle of February. Examples of group projects done in the past will be discussed in class.

General instructions about the independent research: You may do practical or theoretical research. For practical research, choose a topic that is appropriate such as Web-services, IBM websphere, Microsoft sharepoint services, wireless encryption, SSL certificates, Cyber forensics, Cyber Security, etc. and implement it and write a five to ten page paper about your implementation.

General instructions about the group assignments: Group assignments are given to encourage cooperation among students. Consider yourself as a team leader in a computer network department. Suppose you are asked to prepare specifications and budgets for new implementations. Your first group assignment is this: Suppose your company is planning to install a LAN. You are asked to **prepare specifications and prepare a budget** to connect two servers, 100 workstations, and 10 printers. Assume that you already have the computers, printers, servers and existing cat 5 wiring. Provide alternative specifications, and different budgets based on the alternatives to present to a board meeting. You will need to research what is required to do the network, how to set up access to the web, etc. You may want to visit Dell, HP, IBM, etc. to find out what is available. Additional assignments will be given every 3 or 4 weeks.

Programming assignments:

1. Write a Java program to discover the IP address of your machine.
2. Write a program to send a file across Transport Service Access Points (TSAPs) also known as TCP ports or Sockets. Your program can select any non-privileged port (that is, the port number should be greater than 1024).
3. You have a choice for this assignment: Write a server program to make use of threads. Write appropriate client program to test it. OR Write a Java program to open a file on a remote computer and look up records.

Drop Policy: A student who requests a drop on or before THE OFFICIAL DAY TO DROP will receive a DR. After that DP or DF will be given based on the academic standing at the time. It is the responsibility of the student to take care of necessary paper work to receive DP, D, or W. All DP/DFs should be handled prior to the official cut off date for dropping.

Attendance is required. A student with three or more unexcused absences (10% of the classes)

will be given a DF.

Classroom Conduct: All students are expected to demonstrate professional behavior and use language appropriate for the classroom learning experience. **All cell phones must be turned off during class.** Cell phones must be entirely out of sight (inside a closed backpack or purse, for example) during exams and other in-class assignments.

Documented Disability: If you have a documented disability which will make it difficult for you to carry out the work as I have outlined and/or if you need special accommodations/ assistance due to the disability, please register with the Disability Services office (DS), University Center #108, 665-7005 or disabilityservices@utpa.edu immediately. Appropriate arrangements/ accommodations can be made.

Tentative Schedule.

WEEK	TOPIC	CHAPTERS	Assignments due
	Introduction & Overview. Network Programming	1,3	
	Traditional Internet Applications Data Communication Basics	4,5	
	Information Sources & signals Transmission Media	6,7 Lecture notes	
	Reliability and Channel Coding Transmission Modes, Modulation	8,9,10	
	Multiplexing and Demux Access and Interconnection	11,12	
	LAN, Layer1, Layer2	13,14 Lecture notes	
	Wired & Wireless Networking – Exam1	15	
	Spring break		
	Wired and Wireless Networking	15 & 16	
	LAN extensions, WAN	17,18,19	
	Internetworking, layer3	20,21 Lecture notes	
	Forwarding, Support protocols	22,23, notes	
	IPV 6, UDP, TCP	24,25,26	
	Routing Protocols, Performance, VOIP, Security	27,28,29	
	I will give you rest of the schedule later		
	PROJECT PRESENTATION SCHEDULE		
3-18	Group 2		
3-25	Group 6		
4-1	Group 1		
4-8	Group 4		

4-15	Group 3		
4-22	Group 5		