CS 535
Course Syllabus

Outline

Introduction and Overview	Tanenbaum Chapter 1
	PNA Preface
Networking as IPC	PNA Chap 6
Basics of Applications	PNA Chap 4. pp 97 - 122
Principles of Protocols	T-Chap 3
	PNA Chap 2 & Chap 3 pp 57 - 85
Basic Physical Layer	T-Chap 2
Assembling Some Pieces	
Access Control	
Multiple Systems with relays	
Routing and Relaying	T – Chap 5.2
Considering Multiple Systems	
The Network Layer	T – Chap 5.5 – 5.7
Naming and Addressing	PNA Chap 5
"End-to-End" Error Control	T – Chap 6 except 6.4.2 and 3.
TCP/IP and the Internet	
Congestion Control	T -Chap 5.3,4 PNA Chap 3 pp85 – 95
How Networks Work	PNA Chapter 7.
Name Resolution Systems	PNA Chap 4. pp 132 - 135.
Network Management	PNA Chap 4 pp. 123 – 129
Current Applications	T-Chap 7, Chap 6.4.2 - 3
Ethernet and other Media	T – Chap 2.3 – 4, Chap 4, PNA Chap 9.4
Wireline Physical Layer	Rest of T- Chap 2,
	T – Chap 2.5 -7
Security Mechanisms	T-Chap 8.

Textbooks
There are no good networking textbooks. With one exception, they are all written for a trade school, not a university, and they are full of errors. I have found Tanenbaum the least objectionable. So we will use my book for laying foundations and Tanenbaum for some of the details about what is out there today. I guarantee that this is not an ordinary networking course.

Day, John. Patterns in Network Architecture, Prentice Hall, 2008.
Tanenbaum, A. Computer Networks, 5th Ed Prentice Hall, 2011.

Course Mechanics

- Grading: The course will be based on homework (20%), exams (40%) and projects (40%). Homework and projects are expected to be submitted by their due dates. Late submission grades will be scaled accordingly. Exams will be open book.

- Homework: There will be approximately eight homework assignments. Usually, homework will be due at the beginning of class on the date specified. Late homework will be penalized 20% for being one business day late and will not be accepted thereafter. You are encouraged to work together to learn the material and to discuss approaches to solving homework problems. However, *you must come up with and write up the solutions on your own.* Note: that at 20%, the homework does not effect your grade much. The purpose of the homework is to help you ensure that you understand the material. Cutting and pasting answers from the web may be quick and you may get a good grade, but it won't matter much if you haven't understood the material and don't score well on the exams.

Administration

- **Office Hours:** Before or after class is best. I will generally be on campus well before class. Contact me by email if you wish to see me before class.

- **Email**: You are required to periodically check your email since that is the way many assignments will be distributed. Questions via email are always good. If the question/answer has general interest, I will broadcast it to the class (leaving the questioner anonymous); if the solution is very involved, we may need to go over it in person. Also, please check your email for unexpected occurrences like errors in assignments, cancellations, etc. Check blackboard frequently as well.

- **Course Web Site:** We will use Blackboard (blackboard.bu.edu). I will use it to post class notes, lab and homework assignments, homework solutions, and other course information.

- **Incompletes**: Incompletes will only be granted in accordance with university policy, which (broadly) requires a major crisis near the end of the semester.

- **Course Notes**: Class notes will be posted before the class. You are encouraged to annotate them during class.

- **Academic Honesty**: Please read the university academic code of conduct. If something is not clear, then ask. In particular, plagiarism is regarded as a serious offence and students engaging in this activity will be reported. If you use a source, cite it. . (Not related to academic Honesty, but germane. I do not consider wikipedia an authoritative source on any subject. It may be used to find more primary sources or cite it to illustrate opinions. But it can not be considered definitive.)

- **In Class Distractions**: Please turn off cell phones and close laptops at the start of class. If you must text during class, please leave the class to do it. If you need to leave the class to text, there is no need to return to the class.

- **Instructer Errosr**: Don't be shy! If you see me make a mistake, please let me know right away. If you are not sure, that's even better – it might give me a chance to clarify something. Class lecture is a test to see if you are listening. ;-)

Keys to Success in this (and most other) Course(s)
Attendance! Coming to class is important. Some of the material (and much of the perspective) in this course will be found nowhere else.

Do the readings! Work out the examples as you read. If you are not positive that you understand something completely, try inventing and solving your own problems.

Take notes! In particular, print out the course notes ahead of time and annotate them during class.

Participate! Ask questions; talk with your fellow students. Be active.

Keep up! Before each class, read over the notes from the previous class.

Allocate enough time! Much of the material is time-consuming to master. There is a big difference between "kind of" understanding a subject and "really" understanding it.

How do you know that you know the material? A good metric is whether you would feel comfortable standing in front of a class explaining it. Another is whether you think that you could explain it to a job interviewer!

(Not So) Picky Things I *REALLY* Care About

- Punctuality. Please come to class on time. Unfortunately, unlike coming late to a movie, coming in late to class distracts the presenter as well as the presentees. Unfortunately, given some of you are coming from work and Boston traffic being what it is, this may be hard. Let me know if you *can't* make it. We will assume you are coming!
- Preparation. Come to class prepared. If you haven't reviewed new terminology, etc. it makes it very difficult to follow what's going on. (The six Ps: Proper Preparation Prevents Poor Performance)
- Presence. Frankly, I don't care. If you can pass the exams without coming to class that is fine. (I know I shouldn't say this. But it was our attitude when were in school so I can't in all honesty require it from you.) However in this class especially, much of the important information isn't in the textbook. If you decide to take me up on this, you better be good. Like showing your work with homework, if I know who you are I can better gauge your work. If you make yourself just a number, I will tend to see you that way.
- Participation. The best way to learn is to be involved. Conversely, being distracted is the worst. In particular, working on homework during class the day it is due is unacceptable. Get involved. I think this subject is really fascinating from a number of perspectives: scientific, historical, social, political, epistemological, etc. This stuff is fun.
- Powers of 2 and logs. Know them up to 2^{59} (at least) and why this is important.
- Your success!! If you are having problems, come see me! (and sooner rather than later.)

Projects

By the end of Lecture 4, we will have discussed the common structures in protocols and developed a general model of a layer. For a project, take a protocol or group of protocols from the lower four layers or a relaying application protocol and apply this structure to it. Identify and document the mechanisms and policies in the protocol, what aspects are error and flow control and what aspects are relaying and multiplexing, does this protocol follow the structure outlined in class? If not, how does it differ, why does it differ, and should it? Does your example contradict the theory? Is the protocol wrong or is the theory wrong?

Possible protocols: TCP/IP, 802.11, Bluetooth, X.25, HDLC, Ethernet and its LLCs, Mail, Transaction Processing, ATM, ISDN, MPLS, etc.

Or a project of your interest. Possible topics might include:

A specific application with unique properties: p2p, process control in an electric grid, or a refinery or chemical plant, air traffic control, on-line trading, etc.

A specific aspect of networking: error detection/correction, flow control, security, multiplexing, re-transmission strategies, routing, congestion control, wireless protocol performance, distributed calculations, updating multiple copies, etc.

An area of networking relevant to your interests

Or a project of your choosing.