CIS 777
Telecommunications Networks

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- How
- What
- When
- Why

- How am I going to grade you?
- What are we going to cover?
- When are you going to do it?
- Why you should not take this course?

Grading

- Quizzes (Best 2 of 3) 50%
- Class participation 10%
- Homeworks+Labs 40%
  - The division of grades between homeworks and labs will depend on the number of labs
  - Most likely it will be 20% for homeworks and 20% for labs.

Frequently Asked Questions

- Yes, I do use "curve". Your grade depends upon the performance of the rest of the class.
- All homeworks are due at the beginning of the next class.
- All late submissions must be preapproved.
- All quizes are open-book and extremely time limited.
- Quizes consist of numerical as well as multiple-choice (true-false) questions.
- There is negative grading on incorrect multiple-choice questions.
- Everyone including the graduating seniors are graded the same way.

Text Book

- U. Black, "Emerging Communications Technologies," Prentice-Hall, 2nd Ed, 1997, ISBN 0-13-742834-0, 458 pp.
- G. Sackett and C. Y. Metz, "ATM and Multiprotocol Networking," McGraw-Hill, 1997, ISBN 0-07-057724-2, 342 pp.

Supplementary Texts

- W. Stallings, "ISDN and Broadband ISDN with Frame Relay and ATM," **3rd Ed**., Prentice-Hall, 1995, ISBN 0-02-415513-6, 581 pp.
- H. J. R. Dutton and P. Lenhard, "Asynchronous Transfer Mode (ATM): Technical Overview," **2nd Ed**, Prentice-Hall, 1995, ISBN 0-13-520446-1.
- B. Dorling, et al, "Internetworking over ATM," Prentice-Hall, 1996.

Prerequisite: CIS677

- Protocol Layers: ISO/OSI reference model
- Physical Layer: Coding, Manchester
- Transmission Media: UTP, Cat 5, Microwave, Radio
- Data Communication: Asynchronous vs synchronous, Baud, bit, and Hz, Half-Duplex vs Full-duplex, Modulation/Demodulation
- Packet Transmissions: Framing, Bit stuffing, byte stuffing
- Flow Control: On-Off, Window
- Error Detection: Parity, Checksum, Cyclic Redundancy Check

Prerequisites (Cont)

- Error Recovery: Start and Stop, Go back *n*, Selective Reject
- LANs: Aloha, CSMA/CD, Ethernet, IEEE 802.3, Token Ring/IEEE 802.5, FDDI
- LAN Addressing: Unicast vs multicast, Local vs Global
- LAN wiring: 10Base5, 10Base2, 10Base-T, 100Base-T4, 100Base-TX, 100Base-FX
- Extended LANs: Hubs, Bridges, Routers, Switches
- Routing: Distance Vector vs Link State, Spanning tree, source routing
- Network Layer: Connectionless vs connection oriented

Schedule (Tentative)

3/30/99 Overview

4/1/99 A Review of Networking Concepts

4/6/99 Fundamentals of Telecommunications

4/8/99 X.25

4/13/99 Frame Relay

4/15/99 Quiz 1

4/20/99 Frame Relay Congestion Control

4/22/99 ISDN

4/27/99 SONET

Schedule (Cont)

4/29/99 Introduction to ATM

5/4/99 ATM Traffic Management

5/6/99 Quiz 2

5/11/99 IP Over ATM

5/13/99 PNNI: Routing in ATM Networks

5/18/99 ATM Signaling

5/20/99 Wireless Data Networking 1

5/25/99 Wireless Data Networking 2

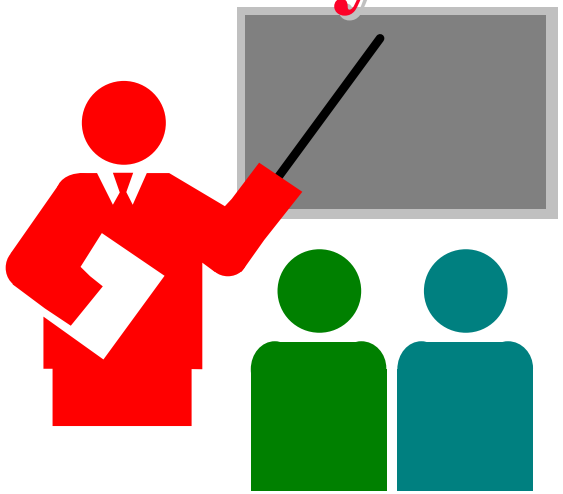
5/27/99 Quiz 3

6/1/99 Graduating Seniors' grades due

Office Hours

- Tuesday: 2:00 to 2:30 PM
  Thursday: 2:00 to 2:30 PM
- Office: 297 Dreese Lab, 2015 Neil Ave
- GTA: Arian Durresi, DL299
  Durresi@cse.ohio-state.edu
  MWF 11:30-12:30

Summary



- There will be a lot of self-reading
- Goal: To prepare you for a career in networking
- Get ready to work hard

Quiz 0: Prerequisites

True or False?

T F

❑ ❑ Datalink refers to the 2nd layer in the ISO/OSI reference model

❑ ❑ Category 5 unshielded twisted pair cable is better than category 3 cable.

❑ ❑ Finding path from one node to another in a large network is a transport layer function.

❑ ❑ It is impossible to send 3000 bits/second through a wire which has a bandwidth of 1000 Hz.

❑ ❑ Bit stuffing is used so that characters used for framing do not occur in the data part of the frame.

❑ ❑ For long delay paths, on-off flow control is better than window flow control.

❑ ❑ Ethernet uses a CSMA/CD access method.

❑ ❑ 10Base2 runs at 2 Mbps.

❑ ❑ The packets sent in a connection-oriented network are called datagrams.

❑ ❑ Spanning tree algorithm is used to find a loop free path in a network.

Marks = Correct Answers _____ - Incorrect Answers _____ = _____

Homework 1

- From Tanenbaum's book, review sections 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 3.6.1

or

- From Stallings' book, review sections 1.4, 15.2, 15.3, 2.3, 3.1, 4.1, 6.1-6.4, 9.2
- Submit answers to exercises on the next slide
- Due Date: Tuesday, April 6, 1999.

Homework 1 (Cont)

- A system has n layer protocol hierarchy. Applications generated messages of length M bytes. At each of the layers, an h-byte header is added. What fraction of the network bandwidth is filled with headers.
- If the bit string 0111011111101111110 is bit stuffed, what is the output string (on wire).
- Two stations communicate via a 1-Mbps satellite link with a propagation delay of 270 ms. Using HDLC frames of 1024 bits with 3-bit sequence numbers, what is the maximum possible data throughput (excluding the overhead bits)?

Homework 2

- From Tanenbaum's book, review sections 4.3, 4.4, 4.5, 5.2, 5.5.1, 5.5.2, 5.5.3, 6.4

or

- From Stallings' book, review sections 12.1-12.4, 13.1, 13.2, 14.1, 14.2, 15.3, 16.3, 17.3, 17.4
- Submit answers to exercises on the next slide
- Due Date: Thursday, April 8, 1999

Homework 2 (Cont)

- Consider a baseband bus with a number of equally spaced stations with a data rate of 10 Mbps and a bus length of 1 km. What is the average time to send a frame of 1000 bits to another station, measured from the beginning of the transmission to the end of reception? Assume a propagation speed of 200 m/μs
- A class B network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet.
- What is the maximum payload of a TCP segment?