

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.
- ❑ Labs require programming in C

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 Thursday class.
- ❑ All late submissions must be preapproved.
- ❑ All quizzes are open-book and extremely time limited.
- ❑ Quizzes 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

- David E. McDysan, Darren L. Spohn, “ATM Theory and Application,” McGraw-Hill, 1998.

Supplementary Texts

- ❑ 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.
- ❑ W. Stallings, "ISDN and Broadband ISDN with Frame Relay and ATM," **4th Ed.**, Prentice-Hall, 1998, 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)

3/30/00 Overview

3/31/00 A Review of Networking Concepts

4/6/00 Fundamentals of Telecommunications

4/7/00 X.25

4/13/00 Frame Relay

4/14/00 Quiz 1

4/20/00 Frame Relay Congestion Control

4/21/00 ISDN

4/27/00 SONET

Schedule (Cont)

4/28/00 Introduction to ATM

5/4/00 ATM Traffic Management

5/5/00 Quiz 2

5/11/00 IP Over ATM

5/12/00 PNNI: Routing in ATM Networks

5/18/00 ATM Signaling

5/19/00 Wireless Data Networking 1

5/25/00 Wireless Data Networking 2

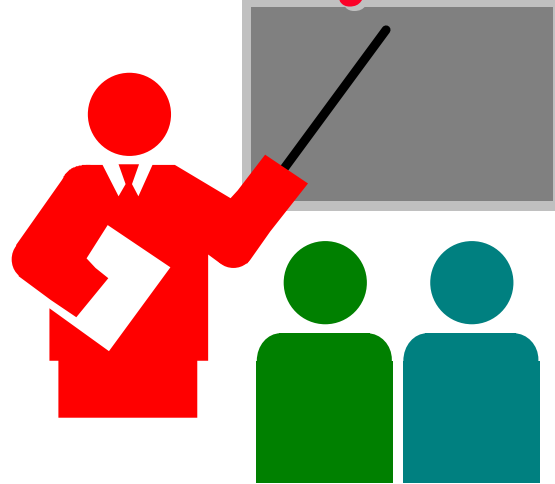
5/26/00 Quiz 3

6/1/00 Graduating Seniors' grades due

Office Hours

- ❑ Thursday: 2:30 to 3:00 PM
Friday: 2:30 to 3:00 PM
- ❑ Office: 297 Dreesse Lab, 2015 Neil Ave
- ❑ GTA: Arian Durrese, DL299
Durrese@cis.ohio-state.edu
MTW 2:30-3:00

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?

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- 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 3rd edition, 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' fifth edition, review sections 1.4, 15.2, 15.3, 2.3, 3.1, 4.1, 6.1-6.4, 9.2, or
From Stallings' sixth edition, review sections 1.4, 2.2, 2.3, 3.3, 4.1, 5.1, 7.1-7.4, 10.2
- ❑ Submit answers to exercises on the next slide
- ❑ Due Date: Thursday, April 6, 2000.

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 011101111110111110 is given to HDLC transmitter, what is the output string (on wire).
- ❑ Two stations communicate via a 1-Mbps satellite link with a propagation delay of 250 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 3rd edition, review sections 4.3, 4.4, 4.5, 5.2, 5.5.1, 5.5.2, 5.5.3, 6.4, or
From Stallings' fifth edition, review sections 12.1-12.4, 13.1, 13.2, 14.1, 14.2, 15.3, 16.3, 17.3, 17.4, or
From Stalling's sixth edition, review sections 13.1-13.4, 13.7, 14.1, 14.2, 15.3, 17.2, 17.4
- ❑ Submit answers to exercises on the next slide
- ❑ Due Date: Friday, April 7, 2000

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 2000 bits to another station, measured from the beginning of the transmission to the end of reception? Assume a propagation speed of 200 m/ μ s
- ❑ 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?