

Carnegie Mellon University
Department of Electrical and Computer Engineering
18-345 Introduction to Telecommunication Networks

Fall 1999

COURSE SYLLABUS

Instructor: Professor Hyong S. Kim

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Class Schedule:

Lecture : Monday and Wednesday 12:30-2:20PM, HH B131

Recitation : TBD

Textbook:

Communication Networks: A First Course, by Jean Warland, Second Edition, WCB/McGraw-Hill.

References:

- Digital Telephony, by J. Bellamy, John Wiley & Sons, Inc., New York
- Data Networks, by D. Bertsekas and R. Gallager, Prentice Hall, New Jersey.
- Data and Computer Communications, by W. Stalling, MacMillan Publishing Company, New York.
- Data Communications, Computer Networks and OSI, by F. Halsall, Addison-Wesley Publishing Company, New York.

Course Objectives

The networking technology is one of the fastest growing engineering areas. “Information Superhighway” promises to provide various digital services ranging from conventional telephone to interactive high-definition TV. Regional telephone companies and cable companies are investing billions of dollars to provide an infrastructure for high-speed networks and new business models are being established through Internet.

This course introduces fundamental concepts of telecommunication networks. Underlying engineering principles of telephone networks, computer networks, and integrated digital networks are discussed.

Topics in the course include: telephone and data networks overview; OSI layers; data link protocol; flow control, congestion control, routing; local area networks (Ethernet, Token Ring, FDDI); transport layer; introduction to high-speed networks (ATM, Gigabit Ethernet); performance evaluation techniques.

Outline of the course

- 1) Introduction to Telecommunication Networks

- 2) Telephone Networks
 - a) Network hierarchy
 - b) Signalling systems
 - c) Switching systems
- 3) OSI Layers
 - a) Physical layer
 - b) Data Link layer
 - c) Network layer
 - d) Transport layer
 - e) Session layer
 - f) Presentation layer
 - g) Application layer
- 4) Local Area Networks
 - a) ALOHA
 - b) Ethernet
 - c) Token ring
 - d) FDDI
- 5) Internet
 - a) TCP/IP
 - b) routing protocols
- 6) Integrated Networks
 - a) ISDN
 - b) ATM
- 7) Performance evaluation techniques
 - a) Simulation
 - b) Elementary Queueing theory concept

Background and Prerequisites:

Probability Theory (36-217 or sequence of 36-211,212 or 36-225,226) and 18-240

Lecture Notes:

The lecture notes will be handed out during lectures.

Problem Sets:

The problem sets will be assigned throughout the course. These assignments will be collected but will **NOT** be graded. They are only to help you understand the material and will not be counted toward the final grade. The solutions will be provided.

Project:

There is a network software project. The objective of this project is to expose students to network software programming. More details will be given later in the course. The project is worth 15%.

Evaluation:

There will be 7 quizzes and 2 exams in the course.

- **Quizzes** : 5 out of 7 quizzes will be counted 5% each toward the final grade. The quiz will be given in the last 30 minutes of the lecture on given dates.
- **Exams** : Exam 1 and 2 are 110 minutes long and worth 30% each.

Quiz Schedule

5 out of 7 quizzes (5% each, **total 25%**) every other Wednesdays starting September 1.

- **Quiz 1** : September 1
- **Quiz 2** : September 15
- **Quiz 3** : September 29
- **Quiz 4** : October 13

- **Quiz 5** : October 27
- **Quiz 6** : November 10
- **Quiz 7** : November 22

Exam Schedule:

- **Exam 1** : October 20, 12:30-2:30 (30%)
- **Exam 2** : December 1, 12:30-2:30 (30%)