

ENEE 420
COMMUNICATION SYSTEMS
Spring 2009

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Text: Simon Haykin, *Communication Systems*, 4th ed., Wiley, 2001

Class Web Site: www.ece.umd.edu/~tretter under ENEE420 Communication Systems

Exams and Homework

Homework will be assigned periodically. It will be due at the beginning of the next class after it was assigned. Solutions will be discussed in class. It is a very important part of the learning process to make your best attempt at solving the homework problems. There is no substitute for the mental process involved in struggling to get the solution on your own! Late homework will not be accepted but the two lowest scores will be dropped.

There will be two exams during the semester and a comprehensive final exam. All exams will be **closed book**.

Final Exam Date: Thursday, May 14, 8:00–10:00 am

		Percent of Grade
EXAM 1	1/3 way through	25
EXAM 2	2/3 way through	25
FINAL EXAM	Comprehensive	40
Homework	due next class	10

COURSE OUTLINE

- I. Background and Preview (Read this chapter to get an overview of various types of communications systems and for some very interesting historical perspectives.)
- II. Chapter 2 Continuous-Wave Modulation
 - A. Amplitude Modulation (AM)
 - B. Double-Sideband Suppressed-Carrier Amplitude Modulation (DSB-SC AM)
 - C. Single-Sideband Modulation (SSB)

- D. Frequency Modulation (FM)
- III. Chapter 1 Random Processes
 - A. What is a random process?
 - B. Stationary processes
 - C. Mean, autocorrelation, and covariance functions
 - D. Random processes and linear time-invariant filters
 - E. The power spectral density
 - F. Narrowband noise
- IV. Chapter 2 Continuous-Wave Modulation
 - A. Noise in receivers
- V. Chapter 3 Pulse Modulation
 - A. Uniform sampling
 - B. Pulse-Amplitude Modulation (PAM)
 - C. Quantization
 - D. Pulse-Code Modulation (PCM)
- VI. Chapter 4 Baseband Pulse Transmission
 - A. The Matched Filter
 - B. Error Rate Caused by Noise
 - C. Intersymbol Interference and Nyquist's Criterion
 - D. Adaptive Equalization
- VII. Chapter 5 Signal-Space Analysis
 - A. Geometric Representation of Signals
 - B. Maximum Likelihood Demodulation
 - C. Probability of error
- VIII. Chapter 6 Passband Data Transmission
 - A. Phase-Shift Keying (PSK)
 - B. Quadrature Amplitude Modulation (QAM)
 - C. Frequency Shift Keying (FSK)
 - D. Discrete Multitone (DMT) or Orthogonal Frequency Division (OFDM) Modulation