

EE421: Communication Systems I

Fall 2004

Instructor:

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Teaching Assistant:

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Lectures:

TTh 4:10-5:30, Sweeney 1126

Office Hours:

Instructor: T 10:00-12:00AM and after lecture hours

TA: W 1:00-3:00PM

Course Website:

WebCT: EE421_2

Course Description:

This is an introductory course on communication systems for undergraduate students, covering basic Fourier techniques and the use of these techniques in the analysis and design of communication systems. Specific topics covered in the class include Fourier transforms and Fourier series, time domain and frequency domain analysis, amplitude modulation (AM), frequency modulation (FM), pulse modulations and multiplexing.

Prerequisites:

EE322 (Probabilistic Methods for Electrical Engineers): credit or registration

EE324 (Signals and Systems II)

Text:

B.P.Lathi, Modern Digital and Analog Communication Systems, 3rd Ed., Oxford University Press, 1998.

Reference:

Ziemer and Tranter, Principles of Communications, 5th Ed., Wiley, 2002.

Tentative Course Outline:

1. Introduction (Ch.1)
 - History of Communications
 - Block Diagram of Communication System
 - Analog and Digital Communications
 - Channel Characteristics
 - Shannon's Capacity Limit
2. Review of Signals and Systems (Ch.2-3)
 - Classification of Signals: will discuss several types of signals
 - Linear Time-Invariant System

- Fourier Transform
- Fourier Series
- Power Spectral Density and Correlation
- Hilbert Transform
- 3. Amplitude Modulation (Ch.4)
 - Double Sideband (DSB), AM
 - Power Efficiency
 - Modulation and Demodulation
 - Quadrature AM
 - Single Sideband (SSB) Modulation
 - Vestigial-Sideband (VSB) Modulation
 - Phase-Locked Loop
 - Super-heterodyne Receiver
- 4. Angle Modulation (Ch.5)
 - PM and FM
 - Bandwidth
 - FM Modulation and Demodulation
 - Interference Analysis
 - Preemphasis and Deemphasis
- 5. Sampling and Pulse Code Modulation (Ch.6)
 - Sampling Theorem
 - Pulse Code Modulation (PCM)
 - Differential PCM
 - Delta Modulation
- 6. Digital Data Transmission (Ch.7)
 - Line Coding
 - Pulse Shaping
 - Equalizer
 - Multiplexing
- 7. Emerging Digital Communications and Some Recent Developments (Ch.8&9)
 - Spread Spectrum Communications
 - Wireless Communications

Homework:

Homework will be assigned approximately once a week, and is due a week later. Cheating is not allowed, but discussions are encouraged. *Late homework will not be accepted without prior permission.*

Grading:

Homework: 15%
Exam I: 25%
Exam II: 25%
Final Exam: 35%

Disability Statement :

If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me soon. Please request that a Disability Resources (DR) staff send a Student Academic Accommodation Request (SAAR) form verifying your disability and specifying the accommodations you will need. DR is located in Room 1076 of the Student Services Building.