

DOĞUŞ UNIVERSITY

CEE 311 ANALOG COMMUNICATION

Required Course

Faculty :	Engineering Faculty
Department:	Department of Electronics and Communication Engineering
Credits:	4 (3-0-2)
Prerequisite:	CEE232
Instructor:	Prof .Dr. Ergül Akçakaya (Room: E/701B, Tel:1318, eakcakaya@dogus.edu.tr)
Text Book:	John G. Proakis and Masoud Salehi, Fundamentals of Communication Systems, Prentice Hall, 2005.

Recommended Books:

1. Modern Digital and Analog Communication Systems, Lathi, Oxford University Press, 1998, 3rd Edition
2. Communication Systems, Carlson, McGraw Hill, 1999, 4th Edition
3. Communication Systems, Simon Haykin, John Wiley, 2001, 4th Edition
4. Fundamentals of Signals and Systems Using the Web and Matlab, Kamen and HeckPrentice Hall, 2000, 2nd Edition
5. A First Course in Probability, Ross, Prentice Hall, 2006 7th Edition
6. Probability and Stochastic Processes, Yates and Goodman, Wiley 1999.

Course Description (Catalog)

Elements of communication systems: Filters. Time/bandwidth relations. Energy and power spectral densities. Amplitude and phase distortions in linear systems. The techniques of linear modulation: Amplitude modulation, double sided modulation, single and vestigial side band modulation. Angle modulation techniques: Phase and frequency modulation. The generation and demodulation of FM signals. FM stereo broadcasting. Frequency division multiplexing. Superheterodyne receivers.

Course Objectives:

1. To develop skills for finding frequency representation of signals and LTI systems
2. To give the principles of analog communication systems.
3. To give the design concept of analog modulators and demodulators from a system point of view.

Content of the Course:

- Introduction. Elements of an electrical communication system, communication channels and their characteristics, mathematical models for communication channels.
- Signals. Size of a signal, signals and vectors, Fourier series, Fourier transform.(Review).
- Analysis and transmission of signals: Signal transformation through a linear system, ideal and practical filters, signal distortion over a communication channel, energy spectral density, power spectral density.
- Amplitude modulation: Base-band and carrier communication, double sideband modulation, single sideband and vestigial sideband modulation, quadrature amplitude modulation, carrier acquisition, superheterodyne receiver, television.

- Angle Modulation: Concept of instantaneous frequency, bandwidth of angle modulated waves, generation of FM waves, demodulation of FM, interference in angle modulated systems, FM receiver.
- Stochastic processes
- Behavior of analog systems in the presence of noise.

Learning Outcomes:

At the end of this course, students will be able to:

- Understand the frequency representation of signals and LTI systems
- Analyze analog communication systems
- Analyze and design analog modulators and demodulators.

Course Evaluation:

1. Students are expected to do 7 homeworks relying on the experiments in the lab.
2. There will be 2 midterm exams in the announced weeks.
3. The course grade will be based on the following weights: First Midterm exam 20%, second midterm exam 20%, laboratory+homework 20%, Final exam 40%