

EE 421 - Communication Theory

1997-1999 Catalog Data

EE 421-4. Communication Theory. Introduction to information theory and a review of the Fourier transform and the convolution integral. Discussion of Nyquist's sampling theorem and an introduction to binary pulse code modulation (PCM). Various analog (AM, SSB, WBFM) and digital (BPSK, AK, FSK) modulation techniques are also discussed and analyzed. Prerequisite: EE 321.

Textbook

Proakis, *Communication Systems Engineering*, 1993, Prentice-Hall

Coordinator

Fred Garber, Associate, Professor of Electrical Engineering

Goals

A goal of the course is to apply the frequency and time domain techniques of linear system theory to an important area of technology. The course is designed to be a one course introduction to communication analysis and design as the foundation course in the three course communication and signal processing design sequence.

Topical Prerequisites

Each student should possess:

- ◆ an intuitive sense of probability and randomness
- ◆ some sense of important physical phenomena like electromagnetic radiation, noise processes, etc.
- ◆ a strong familiarity with linear system techniques in general and the Fourier transform in particular
- ◆ a strong physical sense of how circuits work

Learning Objectives

For each student to:

- ◆ be able to appreciate the significance of information theory, S/N, and bandwidth in the context of modern communication
- ◆ have a fuller understanding of linear systems and how it serves as the analytical framework for communication theory
- ◆ have a detailed knowledge of basic digital and analog modulation methods
- ◆ have a familiarity with the important issues in communication networks

Computer Usage

None.

Laboratory

1. In class video tape demonstrations relating to linear system concepts, the sampling theorem, and analog AM/FM modulation.
2. Demonstrations on aliasing, companding, and differential PCM using a sound board equipped DX2 located in the communication laboratory.

Estimated ABET Category Content

Engineering Science 3 credits or 75%
Engineering Design 1 credit or 25%