

ELEG 5623 - INFORMATION THEORY

Fall Semester, 1985

Catalog Data: ELEG 5623. Information Theory. 3 credits. A study of the fundamental limits of communication and storage, entropy, relative entropy, information, mutual information, channel capacity, source coding, entropy rates, rate distortion theory, complexity, the Gaussian channel and networks. Prerequisite: ELEG 4123 or consent.

Textbook: Elements of Information Theory, T. Cover and J. Thomas, Wiley 1991

References: Information Theory and Reliable Communication, R. G. Gallager, Wiley, 1968

Coordinator: R. A. Jones, Professor of Electrical Engineering

Goal: To give the student a sound understanding of the fundamental nature of communication, information, information rates and capacity.

Prerequisites:

1. Probability, random variables, and stochastic processes
2. Measure theory

Topics:

1. Introduction and Review (1 class)
2. Entropy, Relative Entropy, and Mutual Information (4 classes)
3. Entropy Rates (1 class)
4. Data Compression (4 classes)
5. Complexity (3 classes)
6. Channel Capacity (4 classes)
7. Source Coding (4 classes)
8. Channel Coding Theorem (2 classes)
9. Channel Coding (4 classes)
10. The Gaussian Channel (2 classes)
11. Band-limited Channels (1 class)
12. Rate-Distortion Theory (5 classes)
13. Exams (3 classes)

Computer Usage:

1 project with SPW by Cadence

Laboratory Projects:

None

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 2.5 credits or 83%.
Engineering Design: 0.5 credits or 17%.

Prepared by: _____ Date: _____

