ECE 566 - Information Theory

This course will introduce the fundamental concepts of information theory and its applications to modern compression and communication systems. Shannon’s measure of information will be developed from an axiomatic approach, and will be established for both discrete and continuous sources with and without memory. Fundamental source coding and capacity theorems which set the limits on data compression and communication capacity will be proved. Examples of coding techniques aimed at achieving the results promised by the source coding and capacity theorems will be examined. Finally, network information flow will be introduced.

Credits: 4

Term Offered: Winter 2016

Prerequisites: ECE 353, strong mathematical background

Courses that require this as a prerequisite: None.

Structure: T, Th: 10:00-11:50 AM

Instructor: Dr. T. Nguyen

Course Content:

- Entropy, Relative Entropy, and Mutual Information
- Asymptotic Equipartition Property
- Entropy Rates of a Stochastic Process
- Data Compression
- Shannon Coding Theorems
- Channel Capacity
- Differential Entropy
- Gaussian Channel
- Network Information
- Rate Distortion Theory (time permitted)


Recommended reading:


Grading Policy

Scribing: 10%
Homework 30%
Midterm 25%
Final 35%