Cleveland State University
Department of Electrical Engineering and Computer Science

EEC 653/753 Information Theory

Catalog Data: Information Theory (4 credits)
Prerequisite:EEC 512 or equivalent
This course presents a coherent and unifying view of the concept of information, conveying a unique understanding as to how it can be quantified and measured. Within this context, concepts and principles of information theory as they relate to applications in communication theory, statistics, probability theory and the theory of investment are introduced.

Textbook: Elements of Information Theory, by T. M. Cover and J. A. Thomas, John Wiley and Sons, 1991

References:

1. Information Theory and Reliable Communication, by R. G. Gallager, John Wiley and Sons, 1968.
2. Information Theory: Coding Theorems for Discrete Memoryless Systems, by I. Csiszár and J. Körner, Academic Press, 1981.
3. An Introduction to Information Theory, by F. M. Reza, McGraw-Hill, 1961.

Instructor:
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Hours: TBA

Grading:
Midterm: 35%
Final: 35%
Homework: 30%

Final Exam: TBD

Prerequisites by Topic:

1. Advanced calculus.
2. Probability theory.
3. Introductory stochastic processes.

Topics:

1. Entropy, relative entropy and mutual information.
2. Asymptotic equipartition property.
3. Entropy and stochastic processes.
4. Data compression.
5. Channel capacity.
6. Gaussian channel.
7. Spectral estimation and statistics.
8. Communication networks.
9. Gambling and stock market.