

**School of Electrical and Computer Engineering
Georgia Institute of Technology
ECE 6605 Information Theory
Fall 2004**

INSTRUCTOR

Professor Steven W. McLaughlin
Office: 301
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Course Homepage: <http://www.ece.gatech.edu/users/swm/ECE6605.html>
Office Hrs.: Immediately after class or by appointment.

GOAL

To introduce information theory, the mathematical theory of communications. This is primarily a theoretical course that gives insight into the fundamental limits of communications systems. Practical applications will be discussed when the connection between theory and practice is appropriate.

COMMENTS

This is a math course. Students who have a limited background in communications and signal processing may not get as much from this course as they might like. Information theory underlies virtually all of modern communications and is "required reading" for those who are doing research in telecommunications or want to understand fundamental limitations of communications systems.

TEXT

Elements of Information Theory, by Cover and Thomas, J.W. Wiley, 1991.

PREREQUISITES

Graduate standing (course equivalent to ECE3075 is assumed)

COURSE OUTLINE

Chap. 1: Introduction to Information Theory
Chap. 2: Self Information, Entropy, Mutual Information
Chap. 3: Asymptotic Equipartition Principle
Chap. 4: Entropy Rate
Chap. 5: Data Compression for Discrete Sources
Chap. 8: Channel Capacity, Discrete Memoryless Channels
Notes: Constrained Channels
Chap. 9: Differential Entropy
Chap 10: Gaussian Channels
Notes: Practical Methods for Achieving Gaussian capacity-LDPCs
Chap 13: Rate Distortion Theory

EXAMS

Exams will be 90 minutes in duration. Dates are given below. Location will be announced in class.

GRADING POLICY

Quiz 1, , Thurs. September 16	33%
Quiz 2: Thursday October 21	33%
Presentation?	
Final:	33%