

**School of Electrical and Computer Engineering  
Georgia Institute of Technology**

**ECE 6605 Information Theory  
Fall 2002**

**INSTRUCTOR**

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**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 primarily a mathematics 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 (1 lecture)  
Chap. 2: Self Information, Entropy, Mutual Information (4)  
Chap. 3: Asymptotic Equipartition Principle (3)  
Chap. 4: Entropy Rate (3)  
Chap. 5: Data Compression for Discrete Sources (5)  
Chap. 8: Channel Capacity, Discrete Memoryless Channels (6-7)  
Notes: Constrained Channels (2),  
Chap. 9: Differential Entropy (3)  
Chap 10: Gaussian Channels (5)  
Notes: Practical Methods for Achieving Gaussian capacity-LDPCs (3)  
Chap 13: Rate Distortion Theory (3)

**EXAMS**

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

## GRADING POLICY

Exam 1, Sept 18, in class	33%
Exam 2: Nov 14 in class	33%
Final:	33%