

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
ELECTRICAL ENGINEERING DEPARTMENT

EE430- INFORMATION THEORY AND CODING
SPRING SEMESTER 2003-2004

Course Content:

- Information Theory: 6 Weeks
 - Uncertainty, Information, and Entropy
 - Source-Coding Theorem
 - Huffman Coding
 - Lempel-Ziv Coding
 - Discrete Memoryless Channels (DMC)
 - Mutual Information
 - Channel Capacity
 - Channel Coding Theorem
- Error-Control Coding: 7 Weeks
 - Block Codes, Linear Codes, Hamming Codes
 - Generator Matrix
 - Parity-Check Matrix
 - Syndrome
 - Cyclic codes
- Convolutional Codes: 2 Weeks
 - Convolutional Encoder
 - Tree Representation of Convolutional Codes
 - Finite-State Machine Code Representation
 - Trellis Representation of Convolutional Codes

Prerequisite: EE315, EE370

Textbook:

R. B. Wells, **Applied Coding & Information Theory for Engineers**, Prentice Hall, NJ 1999

Material: **Ch. 1:** 1.1-1.5 **Ch. 2:** 2.1-2.5 **Ch. 4:** 4.1-4.5 **Ch. 5:** 5.1-5.4 **Ch. 6:** 6.1-6.2

References:

1. B. Lathi, *Modern Digital and Analog Communication Systems*, 4th Edition, Oxford Publishing, 1998.
2. S. Haykin, *Communication Systems*, 4th Edition, John Wiley & Sons, 2001.
3. R. W. Hamming, *Coding and Information Theory*, 2nd Ed., Prentice-Hall Inc., 1986
4. J. Proakis and S. Salehi, *Communication Systems Engineering*, Prentice Hall, 1994.

Grading policy:

Projects & Quizzes: 25% **Exam I** (March 22): 20% **Exam II** (May 15): 20% **Final Exam:** 35%

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