

ENEE 624 Error Correcting Codes

This is a graduate course for communications and signal processing students that is designed to provide a solid foundation in the structure and properties of error correcting codes for digital communications, recording, and data storage. In addition to covering the properties and structure of traditional and new codes, emphasis will be given to their encoding and decoding methods, and their performance. *Prerequisites:* ENEE 620, ENEE 622 or 623, or permission of instructor.

SYLLABUS

I. Why Coding (0.5 wks)

Noisy channel coding theorem, simple code examples

II. Linear Block Codes (5 wks)

Structure and properties; construction and representations (Galois fields, linear spaces, bipartite graphs); encoding and decoding methods; and performance.

III. Convolutional and Trellis Codes (4 wks)

Structure and properties; convolutional codes and trellis-coded modulation; Viterbi decoding; other decoding methods; performance.

IV. Special Codes and Decoding Techniques (3.5 wks)

Concatenated codes; Turbo and LDPC codes; bit-flipping and soft-decision iterative decoding; performance.

Texts: R. H. Morelos-Zaragoza, **The Art of Error Correcting Coding**, John Wiley, 2002, ISBN 0471 49581 6 (Required)

J. M. Morris, **ENEE 624 Course Notes**, In the Library (Required)

S. B Wicker, **Error Control Systems for Digital Communications and Storage**, Prentice-Hall, 1995, ISBN 0-13-200808-2 (Recomm'd)

Grading: Homework (20%), Tests (40%), and Final (40%)

Class Meetings: MW 5:30 – 6:45pm TRC 122

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