

EE525.707 Error Control Coding

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Textbook

- No required textbook.
- Recommended: Lin & Costello, *Error Control Coding, Second Edition*.

Grading

- 50% Midterm. Emphasis on linear block codes and cyclic codes. Problems similar to homework.
- 50% Final. Comprehensive but with emphasis on material since midterm (usually Reed-Solomon, Convolutional, Turbo codes). Problems similar to homework.
- 0% Homework. Periodically assigned. Self-graded via detailed solutions provided by instructor. (*Caution:* The homework is more important to your success in the class than the assigned weight might suggest.)

Major Topics

- **General Block and Cyclic Codes.** Definitions, Generator and Parity Check Matrices, Systematic Encoding, Optimal Decoding, Syndrome Decoding, Performance, Linear Feedback Shift Registers.
- **Reed-Solomon and BCH Codes.** Galois Field Arithmetic, Code Construction, Code Properties, Algebraic Decoding.

- **Convolutional Codes.** Shift Register Encoders, Transfer Functions, Finite State Machine and Trellis Representations, Properties, Viterbi Decoding.
- **Turbo Codes** Basic Construction, Transfer Functions, Properties, BCJR Algorithm, Turbo decoding. LDPC codes as time permits.