

## MATH/ECE 641: Introduction to Error-Correcting Codes

Spring Semester 2006-2007: Tues./Thurs. 9:30–10:45 A.M., B341 Van Vleck Hall

**Instructor:** Richard A. Brualdi, 725 Van Vleck Hall

Tel: 262-3298; Email: [brualdi@math.wisc.edu](mailto:brualdi@math.wisc.edu), Web: <http://www.math.wisc.edu/~brualdi>

**Office Hours:** Tuesday: 1:00-2:00, Thursday: 11:00–12:00, and by appointment.

**Textbook:** Introduction to Coding Theory by Ron. M. Roth (Cambridge Univ. Press). A copy is on reserve in the Math Library.

**Prerequisite:** Knowledge of basic linear algebra and fields (information about finite fields will be developed as needed in the course)

**Description:** This course is an introduction to error-correcting codes with some emphasis on Reed-Solomon codes. Topics include: linear codes (generator and parity check matrices) and syndrome decoding, perfect codes (Hamming and Golay), dual codes and MacWilliams identities, bounds on code parameters, Generalized Reed-Solomon codes (encoding and decoding), BCH and cyclic codes, MDS codes.

It is planned to cover the following chapters in the book:

- Chapter 1
- Chapter 2
- Chapter 3
- Chapter 4 (sections 4.1, 4.2, 4.3, and 4.4 only)
- Chapter 5
- Chapter 6 (all sections except for 6.7)
- Chapter 7
- Chapter 8

**Grades:** To be based on regular homework assignments and one in-class exam on Thursday, April 26, 2007.