Course Information

Instructor: John Gill  
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Office hours: Wed 2:15–4:00pm, Thu 10:30–11:45am, and by appointment

Administrator: Helen Niu  
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Telephone: 650-723-8121.  
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Lectures: MWF 9:30–10:20am, Building 540 Room 108

Prerequisites: Linear algebra: matrices, Gaussian elimination  
Elementary probability: binomial probability distribution

Text: Richard E. Blahut, Algebraic Codes for Data Transmission

Bibliography: Todd K. Moon, Error Correction Coding  
Shu Lin and Daniel J. Costello, Jr., Error Control Coding, second edition  
S. B. Wicker, Error Control Systems for Digital Communication and Storage  
A. D. Houghton, The Engineer’s Error Coding Handbook  
Peter Sweeney, Error Control Coding: From Theory to Practice  
Juergen Bierbrauer, Introduction to Coding Theory

Course topics: Chapters 1–8, 12 of Blahut’s Algebraic Codes for Data Transmission:

Introduction to error detection and error correction  
Introduction to algebra: groups, rings, finite fields, vector spaces  
Linear block codes: definitions, minimum distance, bounds  
Cyclic codes and linear feedback shift register circuits  
Logic circuits for finite field arithmetic operations  
Burst error correcting codes and error trapping  
BCH and Reed-Solomon codes  
Product codes; coding gain

Homework: Homework assignments are handed out on Fridays and are due the following  
Friday at 5pm. Some assignments will include simple programming problems.

Examinations: Midterm: Friday, October 31, 9:00-10:20am  
Final: Tuesday, December 8, 8:30-11:30am  
Both exams are in class, open book, open notes.

Grading: 30% Homework assignments  
25% Midterm examination  
45% Final examination