

Math 4012 Algebraic Structures in Coding Theory

Math 4012 is not taught on a regular basis and is currently inactive.

Algebraic Structures in Coding Theory

Department: MATH

Course Number: 4012

Hours - Lecture: 3

Hours - Lab: 0

Hours - Recitation: 0

Hours - Total Credit: 3

Typical Scheduling: no regular schedule

Description:

Introduction to linear error correcting codes with an emphasis on the algebraic tools required, including matrices, vector spaces, groups, rings, and finite fields.

Prerequisites:

[Math 1502](#)

Course Text:

No text

Topic Outline:

Fundamentals of Error Correcting Codes Block codes, Hamming distance, error correction.

Linear Codes Generator and parity-check matrices, dual codes, Hamming and other perfect codes, standard array decoding.

Special Linear Codes Reed Muller codes, self-dual codes, binary Golay codes.

Finite fields Irreducible polynomials, minimum polynomials, properties of finite fields.

Cyclic Codes Rings and ideals, cyclic subspaces, generating polynomials, syndrome decoding, burst error decoding.

BCH Codes BCH codes and BCH bounds, the Euclidean algorithm and decoding BCH codes.

Error Correction Techniques Reed Solomon codes, channel erasures, BCH codes with erasures, interleaving.