

CMSC 442/653: Introduction to Coding Theory

Tentative Syllabus

Instructor: Professor Samuel J. Lomonaco

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TextBook:

Error-Correcting Codes

by W. Wesley Peterson and E.J. Weldon, Jr.

MIT Press (1996)

ISBN 0-262-16-039-0 (harcover)

Course Topic: The applications of abstract algebra to digital communications systems

Background Theme: **Algebra = Computation**

Course Topics:

- Overview of Coding Theory
- Introduction to Modern Algebra
 - Group theory
 - Rings and their Ideals
 - Finite (Galois) fields
- Communication Channels
 - The Binary Symmetric Channel (BSC)
 - The Binary Erasure Channel (BEC)
 - Shannon Entropy
- Algebraic Coding Theory
 - Linear Codes
 - Cyclic Linear Codes
 - Linear Switching Circuits
 - BCH Codes
 - Convolutional Codes
- Quantum Error Correcting Codes (if time permits)

Requirements: An undergraduate course in linear algebra. This means it is assumed that students understand the concepts of vector spaces, subspaces, vector space bases, linear transformations and their matrix representation.

Method of Evaluation:

Homework: 25% ; Exam I: 25% ; Exam II: 25%; Final: 25%.

All exams will be closed books, closed notes, and open mind.

Late homework will **NOT** be accepted. Exams will be given only at the scheduled times. No makeup exams. Exceptions to this policy may be made in cases of extreme hardship.

Academic Conduct:

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal.

To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.