MTH 441: Applied and Computational Algebra

Catalog Description: Applications of fundamental algebraic systems to topics such as factorization of polynomials, finding roots of polynomials, error correcting codes.

Credits: 3

Terms offered: W

Prerequisites: MTH 343, MTH 342 or MTH 440 or MTH 540 required.

Meets: Three 50 minute lectures weekly.

Course Content: The content of this course includes the following.

• Finite fields.

• Coding Theory.

• Cyclic, BCH, Hamming, Golay, and Reed-Solomon Codes.

Learning Resources: A recommended course resource is ‘Algebraic Coding Theory’, by Elwyn Berlekamp (revised 1984 edition). Students will be expected to use Maple, a computer package.

Learning Outcomes: Upon completing MTH 441 a successful student is expected to be able to do the following.

1. Detect errors in algebraic codes.
2. Construct linear codes using linear algebra.
3. Construct cyclic codes over finite fields, including BCH and Reed-Solomon codes, using the theory of finite fields.
4. Collate a library of helpful coding procedures using a computer algebra package.
Evaluation of Student Learning: (Approximate percentages given.)

- Homework and computing problems 50%
- Midterm 20%
- Final Exam: 30%

Students with Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Student Conduct: All students are expected to obey OSU’s student conduct regulations. Here is the link to OSU’s Statement of Expectations for Student Conduct:
http://oregonstate.edu/studentconduct/offenses