

Math 437: Applied Algebra Fall 2019

Instructor: Prof. Patricia Hersh
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Office: 3226 SAS Hall
Office Hours: Tuesdays 10:30-11:30am and Wednesdays 4-5pm.

Class Meeting Time and Location: TuTh 8:30am–9:45am, Park Shops 215.

Text: Applied Abstract Algebra with Maple and Matlab, 3rd edition, by Richard Klima, Neil Sigmon and Ernest Stitzinger.

Prerequisites: MA 403 or MA 407, MA 405

Course Overview and Topics: This course will deal with applications of linear and abstract algebra to real-world problems, many of which arise from coding theory. Topics include: block designs, error correcting codes, public key cryptography and Polya theory.

Designation as Fulfilling a General Education Program (GEP): This course satisfies the “communication in the major” requirement.

Learning Outcomes: The students will learn about applications of algebra, mainly to cryptography. They also will improve their written and verbal communication skills through a presentation in class and the writing of a final paper.

Course Schedule: Block designs (2 weeks); Error correcting codes (4 weeks); Algebraic cryptography (1-2 weeks); RSA ciphers (4 weeks); Elliptic curve cryptography (2 weeks); Polya theory (1-2 weeks). This schedule is subject to change.

Homework: There will be recommended problems, some of which will be collected. Homework will be due at the beginning of class, and late homework will not be accepted.

Quizzes: There will be a few quizzes given in class that will be closely related to homework problems (both recommended problems and problems to be handed in) and fundamental topics discussed in class.

Final presentation: Each student will be required to give a 20 minute presentation in class on the same topic as their final paper. These presentations will take place during the last 3 weeks of the semester.

Final paper: A final project consisting of a 3-5 page exposition of a topic (selected by the student and approved by the instructor) will be due on Tuesday, December 3, 2019. A rough

draft of the final paper is due on Tuesday, November 5, 2019. A list of some possible topics will be distributed midway through the semester.

Grading: Course grades will be determined by homework (20 percent), quizzes (20 percent), final presentation (20 percent), final paper rough draft (10 percent on a credit/no credit basis for timely submission) and the final paper itself (30 percent). For more information, the university's regulation on grades and grade point average (Reg02.50.03).

Late Assignments policy: Late homework will not be accepted. This includes arriving late to class to hand in homework due at the start of class.

Attendance and participation policy: Attendance is mandatory. Please notify the instructor in advance if you must miss a class. For more information, please see the Attendance Regulation (Reg02.20.03).

Academic Integrity Statement: Students are expected to indicate clearly in their homework any references they use to assist them and also to indicate when their work is collaborative with other class members. Collaboration is encouraged, but should be acknowledged. For more information on the academic integrity policy, see the Code of Student Conduct Policy (NCSU POL 11.35.1) and Pack Pledge.

Statement for students with disabilities: "Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resources Office at Holmes Hall, Suite 304, 2751 Cates Avenue, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.01)"

Further university policies: "Students are responsible for reviewing the NC State University PRR's which pertains to their course rights and responsibilities:"

Equal Opportunity and Non-Discrimination Policy Statement <https://policies.ncsu.edu/policy/pol-04-25-05>

Additional references at <https://oied.ncsu.edu/equity/policies/>

Code of Student Conduct <https://policies.ncsu.edu/policy/pol-11-35-01>

Grades and Grade Point Average <https://policies.ncsu.edu/regulation/reg-02-50-03>

Credit-Only Courses <https://policies.ncsu.edu/regulation/reg-02-20-15>

Audits <https://policies.ncsu.edu/regulation/reg-02-20-04> "