

Math 437 – Applications of Algebra

Fall 2017, TuTh 8:30– 9:45 AM, 461 Riddick Hall

Instructor: Seth Sullivant, office: SAS Hall 3114, email: smsulli2@ncsu.edu, Phone: 919-513-7445

Office Hours: Tu 10:00–11:00 AM, W 2:00-3:00 PM, or by appointment

Prerequisites: MA 403 or 407, MA 405.

Text: R. Klima, N. Sigmon, E. Stitzinger. *Applications of Abstract ALgebra with Maple and Matlab*, Second Edition, ISBN 1584886102

Course Website: http://www4.ncsu.edu/~smsulli2/MA437_Fall2017/MA437.html

Course Description: This course will present several applications of linear and abstract algebra to real-world problems. Topics include: error correcting codes and block designs; cryptography; Markov chains and ranking; solving polynomial equations with Gröbner bases; additional topics as time permits. A rough breakdown of material is as follows:

- Markov chains and rankings (2 weeks)
- Coding Theory (4 weeks)
- Cryptography (4 weeks)
- Solving polynomial equations (4 weeks)

Homework: Homework will be assigned roughly weekly and is due in class on Thursday, unless otherwise indicated. Students must write up their own solutions. Working with other students is allowed, however, you must first attempt all problems on your own before discussing solutions with other students. Limit your group size to at most four students. Each student must write up solutions based upon their own understanding of the solutions. Please indicate on your homework any sources that you used in preparing solutions (e.g. any groups members you worked with or discussed the problems with, if another student helped with a solution, or you were aided by reading a particular text).

It is acceptable to use other sources besides the course notes and the text to aid your learning. However, using another student's homework solutions, online homework solutions from courses at other universities, or copying the solutions out of books are unacceptable sources for preparing your homework, and violate the university's academic integrity policy.

Students are encouraged to prepare homework solutions in LaTeX. Homework assignments can be found at the course website as well as information on preparing your homework in LaTeX.

Policy on Late Homework: Homework is due in class on Thursdays, unless otherwise indicated. Late homework will be accepted up to Friday at 5 PM, either to my mailbox, delivered to me in person, or by email and will received 80% of the points. **Each student may turn in at most 2 late homework assignments during the semester.** If you must miss a class on the day a homework is due and you want full credit, it is your responsibility to get the homework to me by the beginning of class on Thursday. **Note that I do not accept scans or photos of homework, so if you are sending me a homework via email it should have been prepared in LaTeX.**

Quizzes: There will be two 20-minute quizzes. Each quiz will be worth 5% of your grade. The quizzes will cover basic definitions and theorem statements only. The quizzes will be on September 19 and November 7.

Final Project: A final project consisting of a short (5 pages) exposition of a topic (selected by the student subject to instructor approval) will be due on December 8th by 5 PM. A list of some possible topics will be distributed later in the semester.

Major Paper Co-requirement: If you are planning to use this course for the Major Paper Co-requirement, you must also enroll in Math 494.

Grades: Grades will be based on Homework (70%), Quizzes (10%), and Final Project (20%). Grades are based on the following scale with $\pm$ grades assigned as appropriate: A : ($> 85\%$), B: (70-85 %) C: (60-70%) D-F: ($< 60\%$).

Attendance: Participation in class activities, group work, and class discussions will be a key contributor to your understanding of the material. You are expected to attend class everyday and participate in the group work and class discussions.

Adverse Weather: Announcements regarding scheduled delays or the closing of the University due to adverse weather conditions will be broadcast on local radio and television stations and posted on the University homepage.

Electronic Devices: You may use your electronic devices in class as long as it is not distracting to the other students or me. (Warning: I get distracted very easily.) Acceptable: Using a tablet to take notes. Unacceptable: Answering your phone in class, typing on a laptop.

Academic Integrity Statement: Students are required to follow the NCSU policy. “Academic dishonesty is the giving, taking, or presenting of information or material by a student that unethically or fraudulently aids oneself or another on any work which is to be considered in the determination of a grade or the completion of academic requirements or the enhancement of that student’s record or academic career.” (NCSU Code of Student Conduct). The Student Affairs website has more information.

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 Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 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).

Class Evaluations: Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructors.