

Math 453 - Section E13/14 - Elementary Number Theory
Course Syllabus

Course Location

MWF 1:00-1:50 Room 445, Altgeld Hall.

Contact information

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Office Hours: Tuesday, 2:30-3:30 pm, Friday, 11 am-12 pm, and by appointment.

Course Information

This course will be an introduction to number theory. We will cover topics relating to divisibility, congruences, arithmetic functions, quadratic residues, and further topics based on time and student interest. This corresponds roughly to the first four chapters of the text, together with chosen sections from later on.

The official prerequisite for this class is Math 241, Calculus III. However, mathematical maturity acquired in courses like Math 213 or 347 will play a larger role. Reading, understanding, and constructing proofs are an integral part of the course.

Website: <http://www.math.uiuc.edu/~jarouse/teaching/F2008/>

Textbook: Elementary Number Theory, James K. Strayer, Waveland Press, ISBN: 1-55776-224-5.

Homework

After each class, I will post several homework problems on the course website. Some of these will be fairly routine, and some will be more challenging. I will mark some of the problems as non-graded, which I recommend doing for your own practice. The remainder should be turned in. Homework from week n will be due at the beginning of class on Wednesday of week $n + 1$.

Homework will contribute 10 percent of the course grade. I encourage working on homework in groups. I ask, however, that each student write up their own solutions without reference to their friends, or their friends' work.

Exams

There will be two in-class exams. Each will be worth 20 percent of the course grade. Material covered in class, in the book, and on the homework assignments (both graded and non-graded problems!) is fair game on the exams. The first exam will be given during the week of October 6-October 10. The second exam will be given during the week of November 17-November 21. The precise dates will be chosen by a vote of the students on the first homework assignment.

The final exam is worth 30 percent of the course grade, and will be given from 1:30-4:30 pm on Friday, December 12.

Calculators are not allowed on exams.

Project

Each student will spend some time working on a project, resulting in a written paper. There are several different options for what this could be. Here is a list of possible options.

- (1) Solving a tricky problem and writing up the solution.
- (2) Reading about a topic of interest and summarizing what you learned.
- (3) Using a computer to investigate certain phenomena, formulating a conjecture based on the data, and comparing it with known results.

Students are welcome to suggest possible project topics. A list of suggested topics and information about grading will be distributed on Monday, October 13. Final project assignments will be made by Monday, October 20. Students must submit a preliminary draft of their paper on Friday, November 21. During Thanksgiving break, I will read and comment on the preliminary draft, which will be returned on Monday, December 1. The final projects will be due on Friday, December 5. Overall the project will be worth 20 percent of the final grade.

Grades

The course grade will be computed from the scores on the homework, exams, and the project. The precise grade distribution will be determined at the end of the course, but a score of at least 90/80/70/60 percent will earn a grade of at least A-/B-/C-/D-, respectively.

Getting Help

Here are some resources.

- Attend Class. I will try to carefully explain more difficult material, and occasionally present (interesting) examples that aren't in the book.
- Read the book. I will not be able to cover all of the material you need to know in class.
- Do the homework. The only way to *really* learn math is to do it yourself. This is your chance.
- Office hours. If you have any questions about the material from lecture or the homework (or anything else), come to my office hours and ask. Also, feel free to e-mail me and ask questions.
- Other students in the class. You should talk to other students, ask them questions, answer their questions, and work with them on homework.
- Tutors. See <http://www.math.uiuc.edu/UndergraduateProgram/tutoring.html>.

General Comments

I am excited about the chance to share number theory, one of the most beautiful parts of mathematics, with you. I pledge to make this class an interesting learning experience for you. In return, I expect each of you to make the most of this opportunity.