MATH 453: Number Theory
SYLLABUS

Lectures:

Section A: Mon+Wed+Fri at 9am in 305 Materials Science & Eng Bld

Section B: Mon+Wed+Fri at 11am in 101 Transportation Building

(Both sections cover the same content. Therefore, if at some point you have to miss your assigned class for some reason, feel free to come to the other class.)

Exams:

Midterm 1: Friday Week 6: February 27 (in class).

Midterm 2: Friday Week 11: April 10 (in class).

Final Exam (Section A): Friday Week 15: May 8 (7:00pm-10:00pm).

Final Exam (Section B): Thursday Week 16: May 14 (8:00am-11:00am).

Homework:

Weekly homework is due at 11pm on Wednesdays and needs to be submitted via Gradescope.

Instructor: Julia Stadlmann

Email: stadl@illinois.edu

Office: Harker Hall, Room 311B

Office hours: Mondays and Wednesdays, 12:30–13:30.

TA: Raghavendra Bhat

Email: rnbhat2@illinois.edu

Office hours: TBA, via Zoom.

Textbook: James Strayer, Elementary Number Theory, Waveland Press, 1994/2002, ISBN 1-57766-224-5.

Course website: Announcements, lecture summaries, homework assignments and homework solutions will be posted on Canvas. Homework is submitted via the Gradescope link on Canvas.

Content

This course is an introduction to the theory of numbers. Other than some very basic familiarity with proofs, no background knowledge is required. Core topics include divisibility, primes and factorization, congruences, multiplicative functions, quadratic residues and quadratic reciprocity, primitive roots and orders. Depending on time, we will also cover sums of squares, Diophantine equations, primality tests and/or continued fractions.

Textbook

The textbook for this course is Elementary Number Theory by James Strayer. We will cover Chapters 1 to 5 in full, as well as parts of Chapters 6 to 8. The book contains many great explanations and exercises. In the back of the book you can also find some exercise solutions.

In addition, I will post some very brief lecture summaries on Canvas, to highlight the most important points and help you catch up if you miss a lecture. However, these summary notes are not intended to replace the textbook, so please make sure to also have a look at the textbook from time to time. It should be very helpful if you are stuck on a homework problem or you need some extra explanation or practice problems for exams.

Course policies

Overall grading: Your course grade will be based on the homework assignments (15%), two midterm exams (25% each), and a comprehensive final exam (35%). Grade cutoffs will be decided at the end of the course, and will be no stricter than 90% for an A– grade, 80% for a B-, and so on.

Exams: There will be two midterm exams, which will be held in class on the following Fridays: February 27 and April 10. The date of the final exam depends on your section. For the 9am class it will be held Friday, May 8, from 7pm–10pm, and for the 11am class it will be held on Thursday, May 14, from 8am–11am.

All exams will be closed book and notes, and no phones, calculators, or other electronic devices will be permitted; where indicated, all work must be shown to receive any credit on a problem.

Missed exams: There will be no make-up midterm exams. Rather, in the event of a valid illness, accident, or family crisis you can be excused from a midterm so that it does not count toward your overall average. Such situations must be documented and I reserve final judgment as to whether an exam will be excused. All such requests should be made to me in advance if possible, but in any event no more than one week after the midterm exam date.

If you have a conflict with the final exam time, please consult the university policy on final exam conflicts. Based on that, if you think your situation qualifies you to take the conflict exam, email me at least one week before the exam date. You will need to provide documentation as to the nature of your conflict, and I reserve final judgment as to which exam you will take.

Homework: Starting in week 2 of the course, weekly homework is due at 11pm on Wednesdays. Generally, the questions on the homework will be based on the material covered in the previous weeks' lectures. Homework should be submitted via **Gradescope**, which can be accessed through Canvas. If you have trouble submitting the homework, email me your work prior to the deadline. I will release homework solutions soon after the deadline, so **cannot** accept late homework.

The purpose of the homework assignments is to have you practice applying the theorems and methods taught in class, and to give you some feedback on your work. For that reason, I want to give you some room to make mistakes: at the end of the semester your total homework score will be multiplied by 1.25 (not to exceed 100%). This also allows you to miss a small number of homework assignments due to illness, an accident, or anything else, without impacting your grade. In short, if you achieve more than 80% of the available homework marks, you will get full credit for the homework component of your grade.

Regrading: If you think an error was made when grading your exam or homework, please email me. All requests for regrading must be made within one week of the item being returned.

Cheating: Cheating is taken very seriously as it takes unfair advantage of the other students in the class, and is handled as per Article 1 Part 4 of the student code. Penalties for cheating on exams, in particular, are very high, typically resulting in a 0 on the exam or an F in the class.

Disabilities: Students with disabilities who require accommodations should contact me as soon as possible. In particular, any accommodation on exams must be requested at least a week in advance and will require a letter from DRES.

Office hours: I have office hours in 311B Harker Hall on Mondays and Wednesdays from 12:30–13:30. I am always happy to answer any questions about course material or the homework, so please don't hesitate to speak with me in office hours, or after class, or via email.