Syllabus

General Info

Course MAT321 Introduction to Number Theory
Instructor Charilaos Skiadas (skiadas at hanover dot edu)
Term Winter 2014-2015
Office SCH 121C
Office Hours MWF 3pm-3:30pm, WRF 9am-10am, T 10am-12am
Book *Number Theory: A Lively Introduction with Proofs, Applications, and Stories* by Pommersheim, Tim Marks, Erica Flapan
Websites for notes[1]
Class times MWRF 10am-11am in SCH246

Course Description

Number Theory is the study of whole numbers, especially related to the notion of divisibility of numbers. It evolves around two key notions: On one side the decomposition of numbers into 'prime' components, on the other side modular arithmetic, which is essentially a generalization of the arithmetic that would take place in a 12-hour clock. Number theory has been an object of study since the ancient times, and still contains numerous simple to state but quite intractable questions.

Number Theory also has important applications to Cryptography. In essence, the security of every internet transaction is based on some fundamental number theory facts, the most common amongst them being that if a number is the product of two large prime numbers, then there is no efficient way to recover those prime numbers if all you know is their product. All current cryptographic techniques make heavy use of the tools we will learn in this class. We will explore some of these connections along the way.

This course is also a perfect opportunity to familiarize yourselves with the various research and proof techniques that mathematicians employ. We will try to provide proofs for most of our assertions, and your homework will ask you to do the same. We will spend considerable parts of each class discussing theorems and their proofs.

Course Components

Reading Assignments

In the class schedule page[2] you will find, for each class day, a list of links to reading assignments. Your homework and lab work will require you to have a solid understanding of the material covered there, so I strongly encourage you not to get behind.

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[1] skiadas.github.io/NumberTheoryCourse/site/
[2] skiadas.github.io/NumberTheoryCourse/site/schedule.html

Class Attendance

You are expected to attend every class meeting. You are only allowed to miss 3 classes without excuse. From that point on, every unexcused absence will result in a reduction of your final score by one percentage point, up to a total of 5 points. Excused absences should be arranged in advance, and backed by appropriate documentation. Emergencies will be dealt with on an individual basis. There are very few reasons that would qualify as an excuse for an absence.

Homework Assignments

There will be homework assignments roughly once or twice each week. You are expected to work on these assignments on your own, but you are welcome to ask me questions.

Exams

There will be two midterms, on Wednesday, February 4th and Wednesday, March 18th, and a final/3rd midterm during finals week. **You have to be here for the exams**. If you have conflicts with these days, let me know as soon as possible. Do not plan your vacation before you are aware of the finals schedule. In terms of your final grade, the exams you did better on will weigh more.

Getting Help

- You should never hesitate to ask me questions. I will never think any less of anyone for asking a question. Stop by my office hours or just email me your question, which has the great benefit of forcing you to write it down in clear terms, which often helps you understand it better.
- You are allowed, and in fact encouraged, to work together and help each other regarding the notes and the practice problems. However, I strongly encourage you to try the problems out on your own first before talking to someone about them.
- You may not discuss homework problems with others. You are free to ask me questions about them though.

Grading

Your final grade depends on class attendance, homework, midterms and the final, as follows:

Component	Percent
Attendance	5%

Component	Percent
Homework	25%
Worst Midterm	15%
Middle Midterm	25%
Best Midterm	30%

This gives a number up to 100, which is then converted to a letter grade based roughly on the following correspondence:

Letter grade	Percentage Range
A, A-	90%-100%
B+, B, B-	80%-90%
C+, C, C-	70%-80%
D+, D, D-	60%-70%
F	0%-60%