Math 437/537: Elementary Number Theory
Fall Term, 2009

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Main Course Website	`http://www.math.ubc.ca/~lior/teaching/0910/537_F09/`
SLATE Website	`https://slate.math.ubc.ca/slate/Slate/2009-2010/Winter_Term1/MATH537`
Contact me at	MAT 229B — 604-827-3031 – `lior@math.ubc.ca`
My Website	`http://www.math.ubc.ca/~lior/`
Class	MWF 10-11 at MATX 1118
Office Hours	By appointment and Mondays 11-12.
Textbook (optional)	Niven-Zuckerman-Montgomery (ISBN: 978-0471625469)
Course Prerequisites	MATH 320 or MATH 322.

About the course

The roots of the theory of numbers are in the study of individual numbers and in finding integral solutions to algebraic equations. We will explore these problems using elementary methods (that is, without using machinery from complex analysis or abstract algebra). We will start with a few weeks on divisibility, congruences, prime numbers, and continue with some of the following topics:

- RSA

- Quadratic reciprocity

- Polynomial congruences

- Multiplicative functions

- Quadratic forms; representation of integers as sums of squares.

- Diophantine approximation and continued fractions.

I will follow the book *An Introduction to the Theory of Numbers* by Niven-Zuckerman-Montgomery published by Wiley (specifically, the fifth edition of 1991). You can buy yourself a copy, but feel free to use any reference that suits you (or none at all, if that is what you like).

What you can expect from me

- To come prepared for class: knowing what we want to achieve, and how we will achieve it.

- Responses to your questions and concerns: continuously in class and during my office hours, within reasonable time by e-mail outside class.

- Timely and clear explanations of what is correct in your work and what is not.

What's expected from you

- Come prepared to class, having read relevant material and done problem sets.

- Actively participate in the course: think about the material, and ask questions.

Official Policies

Learning

- My lectures will assume that you have read some material beforehand. As in any course your main goals are to **work through examples** and become **familiar with the vocabulary and notations**, as well as the **ideas** behind proofs. Learning the details of proofs, while useful, is not the point. As explained above, any text will serve for this.

- Assigned problems may be based on prospective reading material, or develop ideas separate from those taught in class.

Assessment

- Marks will be mostly based on the correctness (rigor) of your proofs, but also on clarity and elegance. Claims which are true but not justified will receive little credit, if any.

- There will be six to eight problem sets; they will normally be due two weeks after they were assigned at the start of the Wednesday morning lecture.

  - Late assignments will not be accepted for credit. In exceptional circumstances (a proof of the emergency and advance notification if possible will be required) a late problem set will be registered (that is, will not be scored a zero) if you finish it and hand it in after the emergency has passed.

  - You are encouraged to work on solving the problems together. However, each of you must write your solutions independently. You may (and should) share your ideas but you may not share your written work.

  - Problem sets after the first will only be available from the course website; solutions will be posted on a companion SLATE site.

- There will be a midterm exam during the week of November 16-20.

  - If you need special accommodations when taking written exams, please contact the Office of Access & Diversity (`access.diversity@ubc.ca`).

  - If the exam conflicts with a religious observance, please contact me *at least two weeks ahead of time* so we can make appropriate arrangements..

- The final grade will be calculated as follows:

Problem sets: 60%
Midterm: 40%