

Mathematics 312, Introduction to number theory, Section 921.

Instructor: Zinovy Reichstein

Summer 2020, Term 1: May 11-June 18, 2020

## **Textbook**

K. Rosen, *Elementary Number Theory*, 6th edition.

## **Course description**

Math 312 is intended as an introduction to the basic concepts of number theory, such as prime numbers, factorization, and congruences, as well as some of their applications, particularly to cryptography. Proofs are integral to the subject, you will encounter them in every part of the course (lectures, textbook, homework, tests, etc.) Rosen's book is well suited to this class; I will follow it closely. Here are the specific sections I plan to cover, subject to minor changes along the way: 1.3, 1.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 4.1, 4.2, 4.3, 5.1, 5.5, 6.1, 6.2, 6.3, 7.1, 7.2, 7.3, 8.1, 8.4, 8.6. Additional topics may also be covered, if time permits.

## **Canvas Page**

I will be relying Canvas for every aspect of the course. Lecture notes will be posted there. Homework assignments and tests will also be posted on and collected through Canvas. Both Collaborate Ultra, where we will be having our meetings, and Piazza, can be accessed through Canvas.

## **Lecture notes**

I will put up four sets of lecture notes per week, each covering roughly a 1.5 hr. lecture. I will make an effort to do this early each week, before our first meeting on Tuesday. These notes will present the highlights of the material we cover in a (hopefully) readily accessible manner. They are meant to supplement the book and sometimes cover material that is not in the book. I will expect you to read both on a regular basis.

## **Lectures**

Our class hours are Tuesday, Thursday and Friday, 10-12 and Wednesday, 10-11. My plan is to meet with you on Collaborate Ultra on Tuesdays and Thursdays, give the weekly test on Friday, and reserve Wednesday for informal discussions on Piazza. Note that I will not be able to lecture on line on Collaborate Ultra the way I usually do in the classroom. Our meetings will be more informal: I will explain the key points in the notes, do some examples and answer questions. It is important that you read the notes ahead of time and bring your questions to these meetings.

## **Homework**

I will assign 6 problem sets in this class, one per week, due on Sundays. Most problems will come from the book. A portion of each assignment will be graded by the course marker.

Late homework will not be accepted. Students are allowed to consult one another concerning the homework problems. However, copying is not allowed; the solutions you submit must be written by you in your own words. It is crucially important that you work through problems on a regular basis in order to practice, absorb and internalize the course material.

## **Tests**

I will give a test in class every Friday 10:30 -11:45. It is essential that you take those: there will be no make up tests for any reason. If you are not available Friday morning, you should not take this class. You are allowed to use the textbook, lecture notes and a calculator during during these tests. No other other materials will be allowed.

## **Evaluation**

I will drop the lowest two homework scores and the lowest two test scores. (If you do not turn in a problem set or a test, it will count as a 0.) Each of the remaining four problem sets will count 5 points towards the course mark. Each of the remaining four tests will count 20 points. There will be no midterms in this class and no final exam.

## **Special nature of this class**

Short summer classes at UBC are always intense: they cover 13 weeks of material in 6 weeks. Count on working 13/6 times as hard as you would if you took Math 312 in the Fall. The course is fast-paced; please make sure you allow yourself enough time to absorb the material each week and don't fall behind.

There is no blueprint for structuring this kind of course on line. I will try to be flexible and make adjustments as needed. Your feedback will be very much appreciated.

## **UBC standards for academic honesty**

Academic honesty is essential to the continued functioning of the University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action.

It is the student's obligation to inform himself or herself of the applicable standards for academic honesty. Students must be aware that standards at the University of British Columbia may be different from those in secondary schools or at other institutions. If a student is in any doubt as to the standard of academic honesty in a particular course or assignment, then the student must consult with the instructor as soon as possible, and in no case should a student submit an assignment if the student is not clear on the relevant standard of academic honesty.