

Mathematics 312, Introduction to number theory, Section 201.

Instructor: Zinovy Reichstein

January-April 2024

Time and Place: 9 - 9:50 am, Monday, Wednesday and Friday, in Earth Sciences Building (ESB). See the Canvas page for the room number.

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

Course description: Math 312 is an introduction to the basic concepts of number theory, such as prime numbers, factorization, and congruences, as well as their applications to cryptography. Proofs are integral to the subject, we 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 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. These will take us most of the term; I will cover additional topics if time permits.

Canvas Page: I will be relying on Canvas for every aspect of the course. Please consult it for up to date information. This page will not be updated.

Registration: I am not authorized to register students into my classes. If you have any questions or concerns about registering for this class, please contact the Mathematics Department.

Homework will be posted and collected on Canvas. I plan to assign six problem sets during the term. My preliminary plan is to collect them on Canvas by 9pm on the following Fridays: January 19, February 2, February 16, March 8, March 22, April 12. (Please confirm the due dates on Canvas closer to the time.) A portion of each problem set will be marked and will count towards the final course mark; see below. Late homework will not be accepted.

Group Work: From time to time I plan to have you work on problems in groups during regular class hours. I will divide you into groups at random. For the first 30 minutes you can discuss the problems with other students in your group. You are also welcome to ask me questions. The remaining 20 minutes you will write up your solutions individually. Marks will be assigned to individual students (not groups); these will count towards the final course mark; see below. My preliminary plan is to have four group work sessions in total, on the following Fridays: January 26, March 1, March 15, April 5. (Please confirm on Canvas closer to the time.)

Note that the main purpose of the homework and group work is to give you an opportunity to practice and internalize the concepts introduced in the lectures. I will assign small amounts of credit to keep you engaged, but evaluation is only a secondary purpose for these activities.

Midterms: There will be two in-class midterms, scheduled for Friday, February 9 (end of week 5) and Friday, March 22 (end of week 10).

Final Exam: There will be a 2.5 hour final exam in this class some time during the final exam period, April 16-27. The specific date and time will be set by the central administration and announced some time in the middle of the term. I will let you know as soon as I find out.

Marking scheme: I will compute the total term mark for each student in two ways,

Total 1 := HW (10%) + GW (10%) + Midterms 1 and 2 (20% each) + Final (40%)

Total 2 := HW (10%) + GW (10% each) + Top midterm (30%) + Final (50%),

and use whichever one is higher. Here HW stands for the total homework score, and GW stands for the total group work score. I will drop the lowest homework score and the lowest group work score and add up the rest for the total in each category.

Note that this is a generous marking scheme. It is designed to cover all eventualities (getting sick, family emergency, oversleeping, etc.) and to eliminate the need for medical notes or make up exams. Please use the concessions it offers sparingly, there will be no others.

Attendance: You are expected to attend the lectures. If you miss one occasionally, you can catch up by reading the lecture notes I post on Canvas. Don't make a habit of it though. I will not check attendance but the exams will assume it. **All exams will be in person, no exceptions.** If your schedule does not allow you to attend the exams, participate in Group Work or to attend the lectures on a regular basis, please do not sign up for this class.

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.