

COURSE INFORMATION

MATH 200 – Discrete Mathematics

Course homepage: <https://web.williams.edu/Mathematics/lg5/200/>

Instructor: Leo Goldmakher (either ‘Leo’ or ‘Professor Goldmakher’ is fine)

Office: Bascom 106A (first floor, in the very, very back)

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Office hours: Mondays at Goodrich 8pm–9:30pm, Tuesdays in my office 2:30pm–4:00pm, other times by appointment.

My office door is often open, and whenever it is—whether or not it’s officially office hours—you’re welcome to drop in. If my door is closed, however, please don’t knock; I’m either out or busy. *Note that Thursday is my research day, and I will be unavailable.*

Lectures: All lectures take place in Stetson 110.

SECTION 1: MWF 10:00am–10:50am

SECTION 2: MWF 11:00am–11:50am

Syllabus: The goal of this course is to introduce theoretical mathematics as a living, breathing discipline. We will explore topics in set theory, number theory, combinatorics, graph theory, and probability. In each of these we’ll encounter some beautiful discoveries from the past, as well as conjectures that no one currently knows how to crack. The hope is for you to learn to think like a research mathematician: creatively and precisely.

Textbook: *Mathematics: A Discrete Introduction*, 3rd edition, by Edward R. Scheinerman.

Teaching Assistants: We’re extremely fortunate to have four fantastic TAs:

- Erica Barrett <elb4@williams.edu>
- Francesca Hellerman <fg2@williams.edu>
- William Johnson <wlj1@williams.edu>
- Ben Kitchen <bnk1@williams.edu>

Discussion sessions: The ideas we’ll discuss in Math 200 are fun, but they are also *hard*. Really, really hard. The most challenging aspect of the course is that, most of the time, you won’t be aware of what it is you don’t yet understand. The TAs will help you with this by giving feedback on HW and quizzes, and I’ll do my best to highlight common pitfalls in class and office hours. But the single best way for you to become aware of your own intellectual blind spots is to *try to explain the material to someone else*.

To facilitate this, I’ve arranged for three evening sessions per week where you can meet with your classmates to discuss material. While not mandatory, I strongly encourage you to attend as often as you can. The discussion sessions will be held at the following times and locations:

- Sunday, 8pm–10pm, in Stetson 110 (hosted by Ben and Erica).
- Monday, 8pm–9:30pm, in Goodrich (hosted by Leo). Free drink or snack!
- Wednesday, 8pm–10pm, in Stetson 110 (hosted by Francesca and William).

Assessment: Your grade will be calculated based on four components:

1. Problem sets – 15% total

This course will have weekly problem sets. Some of the problems will be straightforward once you master the concepts from class / reading, while others will require additional creativity. **The problem sets are intended to be challenging.** The goal is to struggle with every question; it's OK not to solve every problem on the assignment, so long as you make a serious attempt at all of them. However, I have one hard rule: **please do not search for problems, solutions, or examples online.** Expect to spend 10 hours per week outside of lecture time; if you find yourself spending more than 15 hours per week on this class outside of the classroom, please come talk to me.

Problem sets are due on Thursdays at 4pm in my mailbox (just inside the entrance to Bascom House). Late assignments may be submitted at the beginning of Friday's class to me in person (i.e. don't leave them in my mailbox or ask someone else to submit on your behalf); however, 5% will be deducted for submission past Thursday 4pm. *Assignments will not be accepted after Friday's class under any circumstances.* Your lowest assignment score will be dropped.

2. Quizzes – 15%

A fundamental part of any endeavor is learning from your mistakes, and a fundamental part of theoretical mathematics is learning proofs. To encourage both of these, every Monday we will have a short in-class quiz consisting of two questions: (i) a problem lifted directly from the previous week's homework, and (ii) one theorem from a previous lecture, whose proof you will provide. Note that neither question measures creativity—rather, they directly measure the work you put into understanding the material. Your lowest quiz score will be dropped.

3. Midterm and Final exams – 30% and 35%

The midterm will be a week-long take-home exam, to be submitted by Wednesday, March 13th. The final will be a 24 hour self-scheduled take-home exam, to be submitted between May 11th and May 18th. The better of the two exams will be weighted 35%, and the weaker 30%.

4. Outreach project – 5%

The goal of this assignment is to explain a theorem and proof from this class to two different people: one Williams student (who hasn't taken any math beyond multivariable calculus) and one adult (not a mathematician). You will then write a brief essay describing the experience. More details to be given when this is assigned (shortly before spring break).

Team work and plagiarism: I strongly encourage you to brainstorm with other students as you work on your problem sets. However, **you must write up the solutions on your own without copying from any text (written or spoken).** For example, if you take notes during a problem session based on a solution explained to you by the TA or another student, *do not copy from these notes* when writing up your assignment! When you read this sentence, please send an email to our TA William with subject line consisting of the single word ephlat. To avoid a slippery slope, I encourage you to write up your problems sets in physical isolation from any other student and from any notes you've taken while with other students.

Internet usage: The internet is an amazing resource, but I urge you to use it wisely. In particular, I request that you do not search for problems or examples. **Looking up definitions is OK, looking up (or asking about) problems online is not.** It is better to struggle on your own and *not* solve the problem than to simply copy a solution. When it comes to exams, please don't use the internet for any class-related reason apart from accessing the official course website.

Peer Tutoring (free!): The Peer Academic Support network provides free peer tutoring. A schedule showing available individual tutoring sessions for this class is available through the TutorTrac website:

`tutortrac.williams.edu`

The site will be updated weekly, but can only be accessed when you're on the Williams College network. Step-by-step instructions for finding and scheduling tutoring sessions are on the Peer Tutoring Program website (`academic-resources.williams.edu`). If you have any questions about tutoring at Williams, please email `msrc@williams.edu`

Computers and phones in the classroom: Computers and phones *may not to be used at any time in the lecture room*, as this is distracting both for you and for your fellow students. If you have something you need to do urgently on your computer or phone, quietly take it outside the classroom and do it there; I will never be offended by this, so long as you do not disrupt the class. If you take notes on your computer, please talk to me about it.