Math 184 – Enumerative Combinatorics (Spring 2023)

- Lecture times and location: TuTh 9:30AM-10:50AM, Center 216
- Discussion times and location: M 5PM-5:50PM, 6PM-6:50PM, 7PM-7:50PM, 8PM-8:50PM, HSS 4025
- Textbook: Miklós Bóna, *A Walk Through Combinatorics* (4th ed or 3rd ed)
- Course website: http://mathweb.ucsd.edu/~ssam/184/
- Instructor: Steven Sam ssam@ucsd.edu
- Office hours: some in-person, some online, see website for times and location
- TAs: Suhas Gondi, Jesse Kim, Tianyi Yu
- Discord invite link: see Canvas

Course description

Prerequisites: Math 31CH or 109

The main topics are: counting techniques, combinatorial identities, generating functions, and sieving methods. We will do mathematical proofs in this course, so the ability to read and write proofs is crucial. *Note: there is substantial overlap with Math 188. Students who are interested in a more rigorous and challenging experience should instead take 188. You cannot receive credit for both.*

Most of the topics can be found in Bóna's book, though we will not follow its order and we will skip some of the topics. A schedule of topics will be posted on the website and updated as necessary. I will add a few things not in the book, so a copy of my own notes will be kept on the website.

Resources and materials

- Lectures will be podcasted and available through Canvas.
- Discussion section is for further examples and clarification of the course content.
- A written account (my notes) of the lectures are available on the course website. The textbook contains additional examples and details which are omitted from lecture due to time constraints.
- Office hours are available for general discussion or questions about the course and assignments. Discord is also available as an asynchronous option for discussion of the course and assignments with the other students and also the TAs and the instructor.

Expectations

To certify that you have commenced academic activity for financial aid purposes, please complete the FinAid survey on Canvas by the Friday of week 2.

Lectures will closely follow my custom notes. You'll get more out of the lecture if you skim the notes ahead of time and prepare questions. You can find more examples and exercises in the textbook. You are encouraged to work on homework with others, but solutions must be written up individually.

Any students may attend any of the scheduled office hours without appointment (you can go to any TA's office hours). Office hours are an underused resource, so feel free to drop in even if you don't have questions about homework. If none of the scheduled times work for you, please email to make other arrangements.

For asynchronous help or discussion, there is a Discord server. You are free to remain anonymous but you are expected to behave politely and professionally and we will do the same.

All students are expected to use this server, and **announcements will be made there instead of via email**. Any questions about the course or the material should be posted there. **Please do not email me or the TAs about general topics**: it is more efficient to have everything in one place. Also, please refrain from posting solutions to homework, but hints are fine.

If there are issues that cannot be discussed publicly, please email me.

Academic integrity

https://academicintegrity.ucsd.edu/

You are free to collaborate on solving homework problems, but the final writeup must be done individually. If you work with other students, please list their names on your assignment (this will not affect your score). Please refrain from looking up solutions or soliciting outside help online, I really would rather help you myself so that I know which topics are giving students trouble.

You may not work with others during exams. Students suspected of cheating will be forwarded to the AI office.

Grading policy

You get the maximum of the following two grading schemes:

- Homework: 1/3
- Midterm (×2): 1/6 each
- Final: 1/3

- Homework: 1/3
- Midterm (best score): 1/6
- Final: 1/2

I do not follow "standard" cutoffs for letter grades but will not be any stricter. So, for example, a 90% score will guarantee an A- or higher, but the actual cutoff for an A- might be lower depending on how the course goes.

Exams

There are 3 **in-person** exams: 2 midterms and the final exam. Make sure that you have no conflicts during the following times:

The midterms are during lecture on **April 25** and **May 16**.

The final exam is scheduled for **June 13 8AM-11AM**, location TBD.

Exams will be jointly graded by the instructor and the TAs. Problems will focus on computations but also contain some "proof"-type problems and will mostly reflect the homework assignments. For that reason, exams are **closed book and closed notes**.

Homework

Homework is due via Gradescope (either on Wednesday or Friday depending on the week) by 11:59PM except weeks with an exam and weeks 1 and 10. So there will be 6 assignments. This is a large class, so late homework will not be accepted; however, the lowest homework score is dropped.

Homework will be graded by the TAs. Part of the homework score is based on a few exercises to be graded carefully, and the other part is based on overall completion.

How to do well in this course

You cannot learn just from listening to lectures or reading notes. The homework is designed to engage you with the material. So take the homework seriously. Start it early each week and ask questions. Most exam problems will be variations of homework problems, and so if you understand how to solve all of the homework, the exams will be straightforward. Most of the learning takes place by solving problems, so I strongly discourage looking for solutions online or copying from others: every time you do this, you cheat yourself out of learning.

The quarter goes by very quickly and the material builds on itself. As soon as you think you are falling behind, do something about it. We have office hours and Discord, so take advantage of the resources available to you.

Accommodations

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter (paper or electronic) issued by the Office for Students with Disabilities https://osd.ucsd.edu/. Students are required to discuss accommodation arrangements with instructors and/or OSD liaisons in the department in advance of any exams or assignments.