

# **MAT 145: Combinatorics — Syllabus**

UC Davis, Winter Quarter 2022

Instructor: Dan Romik

Document version: January 3, 2021\*

*\*Updated from a previously posted version — see the end for a list of changes from earlier versions*

## **Summary**

- Course location and hours: MWF 2:10-3 in Cruess 107
- Course staff
  - Course instructor: **Dan Romik**
  - Instructor email: romik@math.ucdavis.edu
  - Instructor office hours: Mondays 10:30-11:20 in MSB 2218
  - Teaching assistant: **Matt Litman**
  - TA email: mclitman@ucdavis.edu
  - TA office hours: Tuesdays and Wednesdays 10:30-11:20 in MSB 2137.  
In Week 1, online via Zoom using **this link** (meeting password: “counting”)
- Exam dates: Wed Jan. 26, 2:10-3 p.m. (Midterm 1); Wed. Feb 23, 2:10-3 p.m. (Midterm 2); Mon. Mar 14, 8-10 a.m. (Final exam)
- Course prerequisites: MAT 21C

## **Mode of instruction**

During week 1 of the quarter, the course will be taught online via Zoom, in accordance with the **campus policy announced on December 21**.

In weeks 2–10 the course will be taught in person on the UC Davis campus per the policy currently in effect, or as stipulated by any campus policies that are

applicable during that time.

In the event that campus policies change or the course instructor becomes unable to deliver one or more scheduled lectures in person, lectures may be rescheduled and/or be delivered online via a medium such as Zoom or video recordings.

## **Course textbook**

Discrete Mathematics: Elementary and Beyond, by L. Lovász, J. Pelikán and K. Vesztegombi. Springer, 2003 edition.

Link to download the book from SpringerLink: [SpringerLink](#)

The download is free if done on campus over the UC Davis computer network or through the [UC Davis library VPN](#).

Link to purchase the book: [Amazon link](#)

## **Course description and learning outcomes**

Combinatorics is the study of finite, discrete structures, and nowadays plays an increasingly important role in mathematical methods used in computer science, optimization, and other applied areas. It also has important connections and applications to many areas of pure mathematics.

The primary goal of the course is to teach you the fundamentals of the subject. A detailed list of topics is given in the departmental syllabus for the course, [available here](#). The actual list of topics we will cover may vary to a mild extent from this syllabus.

A second main goal of the class is to enrich your knowledge of and familiarity with mathematical proofs, abstract mathematical thinking, and general mathematical culture. You will emerge with a better understanding of what higher-level mathematics is about, and how it is practiced, that goes beyond the usual “mathematics is about solving equations/integrals” common level of (mis)perception.

## **Homework**

Homework will be assigned weekly on each Wednesday during weeks 1–8 of the quarter, and will be due the following Wednesday. In calculating the homework component of your grade, the two lowest assignment grades (which includes any missed assignments) will be dropped.

## **Exams**

There will be two midterm exams and a final exam. Midterm exams will be given at the regular lecture time and place on the day of the exam. The final exam will be given according to the campus **final exam schedule**. The exam dates and times are:

- Midterm 1: Wednesday Jan. 26, 2:10-3 p.m. in Cruess 107
- Midterm 2: Wednesday Feb. 23, 2:10-3 p.m. in Cruess 107
- Final exam: Monday March 14, 8-10 a.m. in Cruess 107

## **Grading policy**

Your final grade will be determined based on the weighted average of your different grade components (homework, midterm 1, midterm 2, final exam), according to the weighting scheme:

Homework:	30%
Higher of the two midterm grades:	25%
Lower of the two midterm grades:	15%
Final exam:	30%

The numerical weighted average, represented on a scale of 0-100, will be translated into a final letter grade at the end of the quarter, according to the following table of grade cutoffs:\*

A final numerical average of ...	... will translate to a final letter grade of ...
90-100	A-, A or A+
80-89.999	B-, B or B+
65-79.999	C-, C or C+
0-64.999	F

**Example.** Assume that a student, Lenny Euler, received the grades 75 and 86 on his midterm, and 94 on the final exam. His average homework score (with the two lowest assignment grades dropped) was 68. Lenny's final numerical score will therefore be

$$(30\% \times 68) + (25\% \times 86) + (15\% \times 75) + (30\% \times 94) = 81.35$$

Lenny's final letter grade will be in the B- to B+ range (probably a B-, since his final numerical score falls close to the lower end of this range).

\*A disclaimer: at my discretion, the actual grade cutoffs may end up being shifted from the ones described above, but only in the direction that results in final letter grades being even higher than the ones listed above. But this most probably won't happen, and you should not count on it happening.

## Other course policies

- **Late homework policy:**
  - **Late submission with no penalty.** You are entitled to submit one homework assignment up to 48 hours late. No grade penalty will be applied, and you do not need to explain the reason for the late submission.
  - **Late submission with penalty.** If you already used up your approved penalty-free late submission described above, you are entitled to submit one additional homework assignment up to 48 hours late, accompanied by an explanation of the reason why you failed to meet the deadline (and any relevant documentation). A grade penalty of 0-50% will be applied. The precise penalty will depend on the reason and on how late your submission was.
  - Other than these exceptions, no late submissions will be accepted or

graded without explicit approval from the instructor, obtained *before* the submission deadline for the assignment.

- **Make-up exams:** make-up exams will not be given. If you miss an exam for a justifiable reason, please contact me as soon as practicable.
- **Ethics policy:** you are expected to be aware of the **UC Davis Code of Academic Conduct** and to follow and uphold it in all matters. Any violation will be treated with maximal severity and referred to the Office of Student Support and Judicial Affairs.

### **Students with disabilities**

I will provide accommodations for students needing them, e.g., based on a disability, provided the accommodations are approved by the UC Davis **Student Disability Center (SDC)**. If this applies to you, please contact the SDC as soon as possible to discuss your situation and for further guidance. I am also happy to discuss any logistical or technical issues, or generally discuss any requests or suggestions you may have to make the course more accessible and accommodating.

### **Change log: list of changes to this document from earlier versions**

- (1/3/22) Added details of TA office hours