Course Syllabus
Skills for Success in Abstract Math
Math 13X, Fall 2025

Catalogue description. Group activities designed to practice fundamental concepts used in abstract mathematics. Logic and reasoning; functions; sets. Proof techniques. Designed to be taken at the same time as Math 13. Most coursework will be done in class in collaboration with peers.

Instructor. Christopher Davis, daviscj@uci.edu, RH 440J

Class Meetings. Th 2:00-3:50pm in DBH 1427

Office Hours. The instructor will hold weekly office hours, either over Zoom or in person. See our course website for details.

Class Website. `https://canvas.eee.uci.edu/courses/???`

Corequisite. Math 13.

Primary Textbook. *Book of Proof* by Richard Hammack
`https://richardhammack.github.io/BookOfProof/`

Additional references.

- *Proofs: A Long-Form Mathematics Textbook* by Jay Cummings

Who is this class for? All Math 13 students who value and thrive in a collaborative learning environment!

Why should I take this class? Math 13X provides additional practice with fundamental concepts essential to Math 13. The course fosters a positive, collaborative learning environment where students can practice key ideas in a low-stakes setting while working alongside classmates. It's a great opportunity to have fun dabbling in abstract math, make new friends who enjoy math, and learn how to write proofs together. If you're looking to strengthen your understanding and build confidence in Math 13, we strongly encourage you to enroll in Math 13X.

Why do we work in groups? We learn math best when discussing and explaining to each other. We strive to create a community of learners and *doers* of mathematics that supports each other both in this class and in Math 13, and also throughout future math classes.

How did this class come about? The course was developed in response to feedback and suggestions from students. Math 13 occupies an essential place in the Mathematics curriculum at UC Irvine, as it marks the transition from computational lower-division courses to proof-based upper-division courses. Past students strongly encouraged the department to provide more practice and support for those enrolled in Math 13.

Learning Outcomes. The primary learning outcomes for Math 13X are that students will be able to:
Academic Learning Outcomes

- Write precise mathematical arguments using the style and conventions of modern mathematics;
- Answer mathematical questions involving functions;
- Answer mathematical questions involving sets;
- Identify common examples of incorrect reasoning;
- recognize whether a claim can be justified by using an example;
- Justify assertions from calculus using precise 'epsilon-delta' arguments;
- Structure and present a clearly organized argument suitable for an exam setting.

Skill Development Outcomes

- Develop teamwork skills by collaborating with classmates to solve mathematical problems;
- Discuss valuable soft-skills for active math students (such as ask productive questions in class, work with peers on math questions, study effectively for an exam);

- Form friendships with fellow math majors;
- Contribute to the creation of a supportive environment where everyone is comfortable and where we learn from each other;
- Develop a growth mindset.

Class Schedule.

Week	Topic
1.	Conjectures and Proofs
2.	Working with sets
3.	Working with functions
4.	Definitions
5.	Examples and Counter-Examples
6.	Contradiction, Contrapositive, and Direct Proofs
7.	Modular arithmetic
8.	AI and proof-writing
9.	Epsilons and deltas
10.	Proof strategies for exams
Finals.	*Proof portfolio* due

Grading. Grading of Math 13X is Pass/No Pass. To earn a grade of Pass, students are expected to attend at least 8 of the weekly meetings, participate actively, and submit a *Math 13X Proof Portfolio* at the end of the class. See below for more information about the Proof Portfolio.

Participation. Participation from all students is valued and expected. We encourage every student to engage in productive struggles with their classmates and ask lots of questions.

Attendance. Attendance will be taken through uploading activity/worksheet responses at the end of each class. These responses are used for attendance only; they will not be graded. We understand that life happens. If you find yourself unable to keep up with the attendance requirements, please reach out to the instructor and flexibility will be available. If you are interested in joining the class late, please contact the instructor, and do not worry about missed meetings from the beginning of the quarter.

Proof Portfolio. Throughout the course, you will be creating your own *proof portfolio* on a composition notebook. At the end of each class period, there will be time for you to make a contribution to your portfolio. Some weeks these contributions will be of mathematical nature, such as proofs or definitions or examples. Other weeks the contributions will be reflections on the day's material, answering prompts such as "What was the most confusing topic today?" or "Where did I make progress today?"

These contributions will not be graded for accuracy. At the end of the course, you will be asked to upload a PDF version of your proof portfolio (e.g., using a phone camera and the free app CamScanner).

Ed Discussion. Ed Discussion is an online question-and-answer forum. Ed Discussion can be used for asking for clarification on course material, checking logistical details about the class, finding classmates to work with, etc.

Support from the Disability Services Center. University of California, Irvine is committed to providing a barrier free environment for persons with documented disabilities. If you have any questions

about accommodations, please contact the Disability Services Center at 949-824-7494 or register online at https://dsc.uci.edu/.