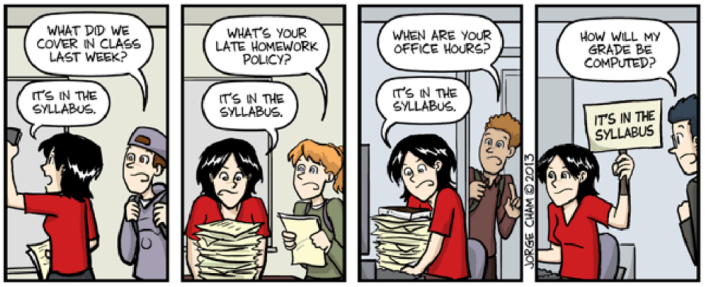
Math 13 Winter 2023: Intro to Abstract Mathematics Syllabus



IT'S IN THE SYLLABUS

This message brought to you by every instructor that ever lived.

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"Piled Higher and Deeper" by Jorge Cham

Instructional Team

Your instructional team is here to help you succeed and to further your mastery of the techniques introduced in this course. I highly encourage you to use office hours, tutoring hours, and other opportunities provided to you by your:

Instructor

Anna Ma
anna.ma at uci.edu*
340D Rowland Hall
Office Hours: M 5:00-5:50 pm, F 10:00-10:50 am, or by appointment.

Graduate Teaching Assistants (TAs)

Matthew Hirning
mhirning at uci.edu
540M Rowland Hall
Office Hours: M 10-12, Th 3:30-5:30

Ashley Shade
jpshade at uci.edu
540M Rowland Hall
Office Hours: M 10-12, Th 3:30-5:30

Undergraduate Learning Assistants (LAs)

Timothy Cho, Maya Drusinsky, Yukang Li, David Militante,
Aditya Krishnan Radhakrishnan, Jackson Solheid, Nicole Vuong, Jiaqi Zhou
Tutoring Hours: T 1-2pm, F 11-1pm at RH 250B

Course Information

When and Where

- Lecture A*: MWF 8:00 - 8:50 am at MSTB 122 with Prof. Ma
- Lecture B*: MWF 9:00 - 9:50 am at MSTB 122 with Prof. Ma

- Discussion A1: MW 1:00 - 1:50 pm at DBH 1425 with TA Matthew, LA David, LA Jackson
- Discussion A2: MW 12:00 - 12:50 pm at PSCB 240 with TA Matthew, LA Yukang, LA Nicole
- Discussion B1: MW 3:00 - 3:50 pm at DBH 1425 with TA Ashley, LA Maya, LA Timothy
- Discussion B2: MW 2:00 - 2:50 pm at RH 184 with TA Ashley, LA Aditya, LA Jiaqi

* Due to class capacity restrictions, please attend **your registered lecture time**.

Course Catalog Description

Introduction to formal definition and rigorous proof writing in mathematics. Topics include basic logic, set theory, equivalence relations, and various proof techniques such as direct, induction, contradiction, contrapositive, and exhaustion.

Materials and Resources

- Textbook: Donaldson and Pantano, Math 13 - An introduction to abstract mathematics. Freely available online at https://www.math.uci.edu/~ndonalds/math13/notes.pdf
- Course Website: I will regularly post weekly schedules (and any necessary updates to that schedule), homework assignments, lecture notes, and grades. It is your responsibility to stay up to date and check Canvas regularly. https://canvas.eee.uci.edu/courses/52059
- Ed Discussion: This discussion forum can be used to discuss questions about the course with fellow students and LAs. https://edstem.org/us/courses/32890/discussion/
- Gradescope: Homework will be submitted via gradescope. Exams will also be scanned and graded on Gradescope. https://www.gradescope.com/courses/483117

Components to your course

- Homework: Homework will be assigned weekly and due on Sundays at 11:59 pm. Homework will be submitted through Gradescope.
- Groupwork: Group work will be administered during discussion section on Mondays.
- Quizzes: Quizzes will be administered during discussion section on Wednesdays.
- Midterm Exam: There will be one midterm in this course on **Friday, February 10**. No makeup midterms will be allowed except in the case of a *documented* emergency. The weight of the midterm will be added to the weight of the final exam in the case of an excused midterm.
- Final Exam: The final exam is cumulative.

Grades

Your numerical grade will be based on homework assignments, group work, quizzes, midterms, and final exams. At the end of the quarter, your final numerical score (computed on a scale of 0-100 as an average of the different grade components as described above) will be translated into a final letter grade according to a curve whose precise nature I will decide upon at that time to ensure a reasonable grade distribution. However, you can be assured that a final numerical score of 90 or more guarantees an A- or better letter grade, 80 or more a B- or better letter grade, etc.

There are two possible grading schemes, and you will receive the grade corresponding to the better of the two schemes.

Scheme 1	**Scheme 2**
Homework - 15%	Homework - 15%
Groupwork - 10%	Groupwork - 15%
Quizzes - 15%	Quizzes - 25%
Midterm - 25%	Midterm - 20%
Final - 35%	Final - 25%

Schedule

Important Days, Dates, and Deadlines

- Weekly Homework ..... due Sundays via Gradescope.
- Weekly Groupwork ..... Mondays, during discussion
- Weekly Quizzes ..... Wednesdays, during discussion
- Midterm Exam ..... Friday, February 10 during lecture
- Final Exams
  - Lecture A ..... Monday, March 20, 8:00 am - 10:00 am
  - Lecture B ..... Wednesday, March 22, 8:00 am - 10:00 am

Course Outline

The course outline is tentative and depends on the progression of the class. Please check canvas for the most up-to-date information about homework deadlines and material being covered each week.

Week	Sunday	Monday	Wednesday	Friday
1		Introductions, Sec 1	Sec 2.1: Propositions* No Quiz	Sec 2.1: Propositions
2	HW 1 Due*	**Holiday, No Lec/Dis**	Sec 2.2: Method of Proofs	Sec 2.2: Method of Proofs
3	HW 1*-2 Due	Sec 2.3: Quantifiers	Sec 3.1: Remainders/Congruences	Sec 3.2: GCD, Euclidean Alg
4	HW 3 Due	Sec 4.1-4.2: Sets, Subsets	Sec 4.3: Unions and Intersections	Sec 4.4: Intro to Functions
5	HW 4 Due	Sec 4.4: Functions	Review Sec 1-4* No Quiz	**Midterm**
6	No HW Due	Sec 5.1: Proof by Induction	Sec 5.2: Well Ordering, Induction	Sec 5.3-5.4: Strong Induction
7	HW 5 Due	**Holiday, No Lec/Dis**	Sec 6.1: Cartesian Products	Sec 6.2: Power Sets
8	HW 6 Due	Sec 6.3: Indexed Col of Sets	Sec 6.3: Indexed Col. of Sets	Sec 7.1-7.2: Relations, Functions
9	HW 7 Due	Sec 7.3: Equiv. Relations	Sec 7.4: Partitions, well-definition	Sec 7.5-7.6: Rings, Congruence
10	HW 8 Due	Sec 8.1-8.2: Cardinality	Sec 8.3-8.4: Countably Infinite Sets	Review Sec 5-8
Finals		**Final - Lecture A**	**Final - Lecture B**	

Remarks, Advice, and FAQs

- **Oh no, I missed it!**: Whether it was a discussion session (groupwork or quizzes) or homework deadline, if you missed it, then you missed it. Late homework, groupwork, and quizzes can be submitted *for feedback*, but ***no credit*** will be given. The lowest homework, quiz grade, and groupwork will be dropped. If you have a *documented* medical or family emergency, your missed homework/groupwork/quiz will not count against your grade.
- **My internet wasn't working, and I missed the gradescope deadline. Can I email you my solutions for credit?**[1] No, please see above! (You'd be surprised how many times I get this email despite it clearly stating in the syllabus that **late work is not accepted for credit.** So here is it a second time, just in case!)
- **Can I attend lecture A if I'm signed up for lecture B (or vice versa)?** No. Unfortunately, we ask that you only attend your registered class due to classroom capacity constraints. If too many students are in the class, it becomes a fire hazard, and I will have to ask you to leave. :(

[1] The answer to this question also includes (but is not limited to) the scenarios: I uploaded the wrong HW, my cat ate my laptop, I slept through the class/deadline, I thought today was Saturday, etc.

- **Should I write my solutions in LaTeX?** You are encouraged but not required to submit your solutions in LaTeX. LaTeX is a technical word document mark up language used in fields where typesetting often includes equations, mathematical formulas, etc. If you are interested in pursuing a graduate degree in mathematics, this is a vital tool, and it's better to start earlier than later. Overleaf[2] is an online LaTeX editor that makes learning and using LaTeX easier than ever. There will be a thread on Ed Discussion for LaTeX-related questions.

- **Let's learn together!** You may, and are encouraged, to discuss problems with classmates. Discussing proofs with other students is a great way to know where to be more concise. There are many ways to prove the same statements, and you can learn much from discussing problems with others.

- **But let's also work independently!** Although *collaboration* is highly encouraged, plagiarism is not. This is a core class for your remaining upper-division math course, and you will not succeed in those courses by claiming others' works as your own. That being said, Academic honesty will be strictly enforced. Any UCI Academic Integrity Policy violations will be immediately reported and handled through the Office of Academic Integrity and Student Conduct (OAISC).

- **What does my grade mean?** A letter grade is simply a quantitative indication of the level of understanding of the course material throughout the quarter. Your grade in this course is simply a measure of how deeply and how well you learned the material covered, and not a measure of personal worth or overall intellect. Please feel free to speak with me anytime if you have any questions or concerns.

- **I'm spending hours studying, but I'm still not doing well on exams or quizzes. What should I do?** This course is probably different from any mathematics courses you've previously taken. Thus, previous approaches for "studying", such as memorizing formulas or mindlessly working through computations, will not help you here. Instead, I recommend focusing your efforts on not just reading the text but also writing, rewriting, and thinking through proofs. If you find yourself in a situation where you're spending hours studying but not seeing results, talk to one of the instructional team members or me to discuss ways and other ideas on how to better master the material in this course.

- **Can you take me off the waitlist?** If you are on the waitlist, please keep up with the material as if you were taking the class officially. Also, neither I nor the TA (nor the LAs) has the ability to add you to the class from the waitlist. Contact mathinfo@math.uci.edu regarding your status and for questions and concerns.

[2] https://www.overleaf.com/learn/latex/Free_online_introduction_to_LaTeX_(part_1)