MATH 230: Introduction to Mathematical Reasoning

Fall 2025 Course Information

1. Times / Locations

Mondays, Wednesdays and Fridays, 1:00–1:50 pm in Wagar 132.

2. Instructor

Professor Amit Patel
akpatel@colostate.edu, Weber 217

Office Hours
Thursdays 8:00–10 am online via Microsoft Teams or by appointment. Please email me the day before to let me know you plan to attend and approximately what time. Teams link available on Canvas.

3. Textbook

Book of Proof (3rd edition) by Richard Hammack (2013)
`https://richardhammack.github.io/BookOfProof/`

4. Course Topics

This course provides an introduction to the foundations of mathematical reasoning and proof writing. Students will learn to formulate precise mathematical statements and construct rigorous arguments, starting with core concepts such as sets, logic, and basic counting principles. These fundamentals will serve as a foundation for mastering a variety of proof techniques, including direct proofs, contrapositive proofs, proofs by contradiction, and mathematical induction.

The primary goal of the course is to equip students with the skills to construct, analyze, and evaluate mathematical proofs effectively. Students will develop the ability to distinguish between valid and invalid arguments and gain an appreciation for the qualities of well-crafted proofs.

These skills are critical for success in advanced mathematics courses, such as abstract algebra, real analysis, and combinatorics. By the end of the course, students will have a solid foundation in proof writing, preparing them for upper-level mathematical coursework.

Part I: Fundamentals

- Sets, Logic, Counting

Part II: How to Prove Conditional Statements

- Direct Proof, Contrapositive Proof, Proof by Contradiction

Part III: More on Proof

- Proving Non-Conditional Statements, Proofs Involving Sets, Disproof, Mathematical Induction

Part IV: Relations, Functions, and Cardinality

- Relations, Functions, Cardinality of Sets

5. Prerequisites

Calculus II (MATH 161 at CSU).

6. Class Structure

The course meets three times per week for 50 minutes (Monday, Wednesday, Friday). Lectures will introduce new concepts and techniques, with Fridays devoted to problem practice and a short (20-minute) quiz.

Each weekly quiz will draw from the assigned homework problems in the textbook. Homework will not be collected or graded; it is intended for your own practice and preparation. You are encouraged to work with classmates and to use available resources, including AI tools. Ultimately, however, you are responsible for mastering the material in order to succeed on quizzes and exams.

7. Homework

Homework will be assigned regularly but **will not be graded**. Because modern AI tools can solve most problems, grading homework is no longer meaningful. Instead, homework is intended as practice and preparation for quizzes and exams. You are strongly encouraged to complete it consistently to keep up with the course.

8. Quizzes

Quizzes will be given in class, usually on Fridays. Your quiz grade will be the average of all quizzes after dropping your three lowest scores. This policy provides flexibility for illness, travel, or other conflicts. No make-up quizzes will be given.

9. Exams

There will be one midterm exam and one cumulative final exam:

- **Midterm Exam:** *Friday, October 10, 2025*
- **Final Exam:** *Tuesday, December 16, 2025, 4:10–6:10 pm*

10. Grading

Your course grade will be based on the following components:

Quizzes	40%
Midterm Exam	25%
Final Exam	35%

The grading scale will follow standard cutoffs, with possible upward adjustments at the instructor's discretion to account for overall class performance.

11. Attendance & Missing Class

Attendance will not be formally recorded, but active participation is essential for success. The course moves quickly and builds critical foundations for advanced mathematics, so regular attendance is strongly recommended.

11.1. Missing a Quiz

There are no make-up quizzes. To accommodate unavoidable absences, your three lowest quiz scores will be dropped.

12. Academic Integrity

This course adheres to the CSU Academic Integrity Policy as described in the Student Responsibilities section of the General Catalog and the Student Conduct Code. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Student Resolution Center. More information can be found at `http://tilt.colostate.edu/integrity`.

13. CSU Resources and Policies

For information about important university policies and helpful student resources, please visit CSU's Policies and Resources page (`https://col.st/2FA2g`).