1. Course Goals

Mathematics is a language used to describe the abstract patterns behind phenomena around us. It’s not just about calculation - it’s more to do with reasoning and precise argument, that is, proofs. In this course, we will become familiar with the language of mathematics, and gain experience writing proofs. One transitions from applying mathematical tools, to understanding mathematical ideas, to (eventually) creating new mathematics. To write mathematics, one has to be a clear writer as well as a very precise thinker. So this course will also refine your ability to think and write clearly.

2. Syllabus

Textbook: Mathematical Proofs: A Transition to Advanced Mathematics by Chartrand, Polimeni, and Zhang. The course is heavily based on this book and so I recommend you borrow or buy a copy.

The course breaks down into Chapters 1-2 (Sets and Logic), Chapters 3-5 (Direct Proof, Proof by Contrapositive/Contradiction), Chapter 6 (Induction), Chapters 8-9 (Equivalence Relations and Functions), Chapter 10 (Cardinality), and Chapter 12 (Proofs in Calculus). Chapter 0 and Chapter 7 are also good to read. Some other material may make an appearance.

3. Instructor

About me: My name is Krishanu Sankar, and I am a postdoctoral researcher at UBC in mathematics. My research is in algebra and topology, although I love all things math and learning new things.

Email: ksankar@math.ubc.ca. I will do my best to respond promptly to email questions. If you have a more involved question and cannot make it to office hours, we can make an appointment by email.


Office Hours: T/Th 12:30-1:30, W 1-2, all in LSK300.

4. Lecture Policies

When: Tuesday/Thursday 11:00 - 12:30

Where: Math Annex 1100
Mathematics is not a spectator sport - the way you learn is by actively participating in class. Lectures will involve in-class exercises to help you learn the material, so bring paper and a writing implement!

I want to minimize distractions in class. So laptops should be closed and put away - unless being used to take notes. Cellphones should be kept away and on silent/vibrate.

If you eat food in class, keep it neat and quiet, and don’t leave a mess. Be courteous to those around you.

5. Assignments and Marks

**Homework:** There will be 10 homework assignments throughout the semester - one per week. They will be due on Fridays at 3pm (Location to be announced on the main course page). These are meant primarily as a learning tool for you. You are encouraged to collaborate with each other, or bring these to office hours - but all work you submit must be in your own words.

**Midterms and Final Exam:** There will be two midterm exams throughout the semester, and then a final exam. Exact times and locations will be announced on the main course page.

**Marking Scheme:** Your final score will be the maximum of the following two possible scores:

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\text{Final score} = 0.1(\text{Homework}) + 0.4(\text{Midterm average}) + 0.5(\text{Final})
\]

\[
\text{Final score} = 0.1(\text{Homework}) + 0.3(\text{Midterm average}) + 0.6(\text{Final})
\]

**BONUS:** If you typeset 9 out of 10 of your homework assignments in LaTeX, you’ll get 2% extra credit added to your final course grade. LaTeX is an extremely powerful typesetting program - it is THE gold standard for typing mathematics. This policy is meant to encourage you to learn to use LaTeX - instructions on how to get started will be provided alongside the first homework assignment. For every assignment in this course, the source TeX files will be posted as well as a template.