MATH 220: MATHEMATICAL PROOF - SECTION 201

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 off 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.

Webpage: http://www.math.ubc.ca/∼ksankar/Math220.html. Further information and updates will appear here.

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:

$$\text{Final score} = 0.1(\text{Homework}) + 0.4(\text{Midterm average}) + 0.5(\text{Final})$$
$$\text{Final score} = 0.1(\text{Homework}) + 0.3(\text{Midterm average}) + 0.6(\text{Final})$$

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.