

# Welcome to Math 122, Logic and Foundations!

This course is fun, and different. This might be the first time you get to find out what mathematics is really like, and of what mathematicians really do. Mathematics explains why things work. Things like numbers and formulas are a means to that end rather than an end in themselves.

We're going to adopt a professional mathematician's perspective while learning about foundational topics in mathematics, including methods of argument. We hope you will get a sense that mathematicians try to discover underlying structure and truth. In trying to understand what is true and why, mathematicians carefully analyse situations, and study examples. Later, we try to convincingly demonstrate (i.e. prove) what we believe to be true. There is no one right way. Different ways can lead to different insights.

Important, useful, non subject-specific, analysis and communication skills are developed in this class (and other math classes). When reading technical materials, newspaper articles, financial reports, legal documents, etc., it can be crucial to understand precisely what is and isn't being said. In careers ranging from business to journalism to law to science, a person must be able to produce and communicate persuasive logical arguments.

We will be giving short "in-class" assignments on many days. These are designed so that a student who has been to class, reviewed their notes, and tried some of the practice problems should have no difficulty. Collaboration with your friends and classmates on these is strongly encouraged. We expect lots of talking and encourage questions! It is amazing how much can be learned by trying to convince someone else that your way -- your answer -- is correct (i.e. trying to prove it to them). An equal amount can be learned by listening to someone else's argument, trying to decide if it is correct, and trying to convince them if it isn't.

This term we are using a set of course notes written specially for this course as the textbook. We hope you find them useful. At the very least you should find them cheap, as they are available for free on the course web page.

Any course can be viewed as a package of about 120 hours of learning. This includes about 36 hours spent in class, time spent studying / doing the suggested work, time spent working on assignments and writing them up carefully, and the final exam. There is educational value in each of these activities. Including the final exam a course is roughly 13 weeks long, so the average weekly time commitment is about 9 hours. It could be more or less, depending on the ebb and flow of the term work. We have tried to even it out as much as possible.

Math 122 requires a significant amount of maturity, thinking, practice and understanding. Math is a lot like language. Skill and fluency develop slowly over time. That can be quite challenging. Planning ahead, starting things early, coming to talk things over, and never giving up is a good strategy for success. (PS: It is intentional that the assignments are supposed to take a whole week to do!) We're here to help when things are not going your way, and we're here to talk when they're going well too.

Based on research done at UVic, we have a decent idea of what it takes to be successful in this class. It involves both us and you. Our job is to provide the environment and the opportunities. Your job is to make the most of this experience. Hopefully we will all have fun. The educational literature predicts that students who make a commitment to learning (in Math 122) will be happier with themselves, and successful in the class. From historical data we know that the average course score for students who do all of the work in Math 122 is B-, with a failure rate of about 8%, compared to an average course score of less than 40%, with a failure rate of about 60%, for students who miss one piece of work or more.

We think you're all capable of doing well in this course. We're looking forward to working with you to help you achieve that.

Sincerely,

Jing Huang, Gary MacGillivray and Joanna Niezen