

Math 3200 Course Outline

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1 Introduction to Math 3200

Welcome to Math 3200, Geometry. Geometry is an ancient subject, which has been around about as long as agriculture. The literal translation of the name is “Earth measurement”. The material we will study ranges from the ancient (Euclid and Ancient Greece) to the relatively recent (linear algebra and modern geometry date from the late 19th century). This is as much a new course for me as it is for you! I hope we’ll be able to have fun exploring it together.

There are many of us in this class, coming from many different backgrounds and situations. If the “default settings” for the class don’t work for you, please don’t hesitate to ask for accommodation. Not everyone has reliable high speed internet. Not everyone is able to attend scheduled classes without work/family/life getting in the way. But everyone deserves a fulfilling, enjoyable learning experience in each class.

We begin with some introductions: to the university, to the staff, and to the course.

1.1 Welcome to the University of Lethbridge

Oki, and welcome to the University of Lethbridge. Our University’s Blackfoot name is Iniskim, meaning Sacred Buffalo Stone. The University of Lethbridge acknowledges and deeply appreciates the Siksikaitsitapii peoples’ connection to their traditional territory. We, as people living and benefiting from Blackfoot Confederacy traditional territory, honour the traditions of people who have cared for this land since time immemorial. We recognize the diverse population of Aboriginal peoples who attend the University of Lethbridge and the contributions these Aboriginal peoples have made in shaping and strengthening the University community in the past, present, and in the future.

Unless you took a pass on the last semester, this is not your first crack at learning online. Making connections as we learn remotely will be a challenge, but somehow we’ll do our best to make this happen. One of the ways we’ll try to encourage community is by having regular group work, where you’ll be able to interact with other students in the class. Another is by having an active discussion platform. This year we’re trying out a new system, called **Campuswire**.

As usual, everything you need to know for the course will flow through our [Moodle](#) learning management system. Make sure you check in regularly to keep on top of what’s happening in the course. (Possibly the hardest part of learning online is keeping track of deadlines.)

Don’t hesitate to reach out if you have questions. I’ll do my best to answer all of your course-related questions as quickly as possible. (See [Section 3](#) for details on how to get in touch.) If you have questions that are not related to the course, you can ask those too, and I’ll try to answer, or to direct you to someone who can. Some resources can be found on the University’s [Health and Safety website](#).

1.2 Course staff and contact information

My name is [Sean Fitzpatrick](#). I can be reached via email at sean.fitzpatrick@uleth.ca.

Student hours: you are not going to get everything you need during class time. I will be available throughout the week for consultation, either one-on-one, or in small groups. Monday through Thursday, you can book appointments using Calendly. You'll find the links for booking appointments on Moodle. Any appointment can be in person, or over Zoom — just indicate your preference when booking. Friday I will have drop-in student hours: 9:30 – 11:30 am in my office.

1.3 Course description

Classical (Euclidean) geometry is a great playground for learning rigorous proof. The books of Euclid's *Elements* formed a canonical textbook, used for over two millennia as part of a standard mathematics education.

From Euclid, we see how to begin from a set of *postulates* (those truths that we hold to be self-evident), and proceed from there to see what else can be deduced. In Euclidean geometry, we will see how to use a (digital) compass and straightedge to construct things like equilateral triangles.

We will also explore geometry beyond Euclid. It turns out that at least one of Euclid's axioms was not as self-evident as it seemed! Mathematicians spent centuries trying to prove that Euclid's "parallel postulate" could be derived from his other axioms. It was only at the end of the 19th century that some thought to ask a simple question: what happens if the parallel postulate is false? By removing it, we are able to pass from the "Flatland" of Euclidean geometry to other worlds, where space can be curved, parallel lines can intersect, and all sorts of fun can happen.

1.4 Online instruction and COVID policies

This time, only one section is online, but we should be prepared to go remote at any time, either individually (if you have symptoms or have been exposed to COVID), or as a class (if the 4th wave continues to get out of control). Note that it is likely there will be times when a class has to be taught online because the instructor is unavailable. We are likewise not allowed to come to campus if unwell. I may also have to teach from home because one of my kids is sick and has to quarantine.

I will do my best to ensure that the course experience is as similar as possible for all students, including those enrolled in the online section.

Our COVID policies will be as follows:

- Masks are required for all in-person interactions, as per university policy. If you cannot wear a mask, I would be happy to have you join us in the online section. This rule is non-negotiable. If a student attending in person refuses to wear a mask, our options are to either cancel class, or remove the offending student from the classroom.
- If you are at all ill, you must stay home. I will make arrangements for any in-class work to be done remotely.
- If an instructor for an in-person lecture or tutorial has symptoms, but is well enough to teach, that class will be temporarily moved online. A Zoom link will be posted to Moodle should this occur.
- I have two children in elementary school who cannot yet be vaccinated. There is a good chance that at some point I will have to move a class online because I have to stay home with them. I will give you as much notice as possible if this happens, and do my best to minimize disruption.

Whether online or in person, you can expect:

- More emphasis on:
 - Conceptual understanding
 - Discussion
 - Context (the whole “what is this good for?” routine)
 - Being generally swell human beings
- Less emphasis on:
 - Memorization
 - Routine computational proficiency (let’s be honest: the computer can do this better than us most of the time)
 - Tests and exams (so I can spend more time teaching and less time as the Math Police)

We are scheduled to meet in person as long as this is feasible. I hope you’ll be able to make it to each class. There will be opportunities for discussion, and to work on problems (including ones you’ll be handing in) with your classmates.

But our first priority this year is to protect the health of everyone. If you are feeling sick, please stay home. But do let me know if you’re able to, so I can plan accordingly.

For those of you attending remotely, expect a few bumps at first, while I figure out how to make this work for everyone.

2 Essential course information

This section covers essential course information, including the meeting times, textbook, and grading scheme.

2.1 Course website

The primary course website is [Moodle](#). On Moodle, you can expect to find:

1. Links to important resources, like this syllabus, and the textbook.
2. Links to key course activities, including the online homework, and the discussion forum. (The links will log you into those services automatically.)
3. Details about your grades and assessments.
4. A weekly topics schedule.

As you learn to navigate online learning (and as I learn how to guide you), the weekly topics schedules will be key to staying on top of your course material. Every week you can expect to receive details on readings, videos, homework, and assessments, as well as information on what will be taking place in class, and how to access those classes.

In case there’s a day when Moodle isn’t working properly and you need access to course materials, you can find some of them (like this syllabus) on my [personal website](#). The textbook for this course (and many others) is available on our [Open Textbook Server](#).

2.2 Scheduled classes

Math 3200 will be delivered in-person, in PE261. As needed, online access (ideally synchronous) will be provided.

On Monday, I will present content for the week. This will consist of highlights of the important theorems and concepts, and some examples. I won't be able to cover everything in one class, so I will be expecting everyone to keep up with the readings.

Tuesday classes will be used for "labs". These will be explorations, usually involving software such as [GeoGebra](#).

Thursday will be for proving. We will have written assignments, which you will be able to complete in groups, and much of Thursday will be devoted to working on these assignments.

2.3 Course textbook

Our course textbook is *The Four Pillars of Geometry*, by John Stillwell. You can access the book for free via [Springer Link](#). If you are off-campus, you will be prompted to enter your U of L login credentials to access the book. (no VPN required).

If getting the book for free somehow feels wrong, or you worry you're missing out by not buying anything, here is a great book you can buy (especially if you're in Education):

[Mathematics for Human Flourishing](#), by Francis Su.

2.4 Grading scheme

Our assessment principles this year:

- No big high stakes assessments: lots of little ones instead.
- This is all about learning to write proofs. Class should be a safe space to make mistakes, learn from them, and improve.
- Classes (the synchronous part) will be used for work, not lecture. But doing the work in class is not a *requirement*. Any work you miss during class can be made up outside of class.
- Group work is good for you. (Even if you don't always like it!)

The various graded components of the course are explained below.

Communication (10%) Your *communication* grade comes from regular contributions to class discussion. This can be achieved in several different ways:

- Textbook annotation. Using the Hypothes.is tool, add commentary to the textbook. Ask questions, respond to other students, make comments, etc..
- Class discussion forum. A discussion forum (using Campuswire) will be available through Moodle.
- Presentations. These can be done live (in class or over Zoom), or pre-recorded.

How this is graded: at the end of the semester, I will ask you to submit an activities report, outlining the contributions you have made during the semester. In this report, you will give yourself a score out of 10, and make a case for it. You should give yourself 2-3 points for a presentation, depending on level of effort and quality of the presentation. For *significant* contributions to the forum or textbook annotation, you should give yourself between half a point and one point. Adding a comment like "Hey, good point! I agree with you", while great for encouragement, is not significant.

Reading questions (15%) Every week I will provide short reading assignment on Moodle. This will consist of a few questions that you'll need to read the book in order to answer, or possibly a reflection question. Questions will be submitted as a Moodle *Workshop*, and due prior to class each Thursday. After class, I will switch the workshop from the "submission" phase to the "assessment" phase, in which you will be asked to give (anonymous) feedback to several of your peers.

10% of your grade will come from your submission. The remaining 5% will be for completing the feedback.

"Lab" Assignments (25%) Every Tuesday, you will have time to work on a lab assignment in class. Usually this will involve GeoGebra. There will be 6 labs in total, due every other week.

Written Assignments (25%) I will provide you with time to work on these in class every Thursday. Assignments will be due every other week, with 5 assignments in total.

Typically a written assignment is expected, but interested students are encouraged to explore alternative formats, such as video.

For both lab and written assignments, I will expect you to work together during class time. Group submissions are allowed (encouraged, in fact), but individuals who are not satisfied with the contributions of their group will be allowed to submit on their own.

You will also be allowed to present corrections, once your work has been graded. This is probably best done during class time, or office hours.

Project (25%) There will be a final project. This can be done individually or in collaboration, with the understanding that I would expect a group project to be more substantial than an individual effort. The project can deal with any aspect of geometry: theory, application, education, etc.. It can be a written project, or any sort of multimedia presentation: video, book, artwork, and coding are all possibilities. Dance? Maybe.

Regrading policy: for both quizzes and assignments, once your work has been evaluated, you will have an opportunity to address the feedback you received. You can get back up to 50% of the points you lost by explaining what you did wrong, and how to correct it. Your explanation should reflect the fact that you have read and considered your feedback, and thought about steps you can take to avoid similar mistakes on the next test.

You may submit corrections in writing, or in person during class, or office hours.

Each of the grade components above will be assigned a numerical score. These will be added to get a score out of 100. Your score out of 100 is converted into a letter grade according to the following table.

Table 2.1 Conversion of percentage scores to letter grades in Math 3200

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	F
97-100	92-96	90-91	86-89	80-85	77-79	73-76	68-72	64-67	60-63	50-59	0-49

3 Communication

The following communication channels are available in this course:

1. *Forums.*

There will be a primary course Q&A forum using [Campuswire](#). We are switching to Campuswire for the first time this semester, because the forum we used to use (Piazza) has switched to a paid/ad-supported model. Use of Campuswire is not mandatory (some of you may have privacy concerns) but it is strongly encouraged.

As far as I can tell, Campuswire provides a better product in any case. We still get a Q&A forum, and the forum still has useful features, like support for mathematical notation, and the ability for students to remain anonymous to their peers.

What's better is that the forum uses individual replies, rather than a single wiki-style reply, where one student ends up overwriting the reply of another. You can also upvote questions and answers that you like.

Another useful feature is the availability of chat rooms. Students have the ability to set up chat rooms, and you can make these private. (Yes, a private chat room can even exclude your instructor.)

Campuswire should be your primary communication channel. In particular, any questions about homework and course content should be asked there, since I can reply there with mathematical notation. You will also get a much faster reply on the forum than you will from email. If you have a question you don't want to ask publicly, you can send a direct message instead.

To access Campuswire, use the signup link and PIN code provided on Moodle. But note that to sign up this way, you will need to use your U of L email address. If you prefer not to provide your school email address to a third party company, you can ask me to send you an invite to a different email address.

2. *Email.*

You can email me for questions that aren't related to course content. For example, if you have to miss class, or a test, you can email me to let me know.

4 Course policies (an FAQ)

This section deals with questions about accommodations, missed tests, and other exceptional (yet common) cases.

1. *I don't think I can attend the classes regularly. Can I still take the course?*

Short answer: yes. I recognize that not all students have access to the same technology. If your home internet is unreliable, attending Zoom sessions could be a challenge. If you can't attend synchronous sessions, I will arrange alternatives for graded work done asynchronously. I will also try to connect you with other students in the same situation, so that you still have a group you can work with.

2. *What happens if I get sick?*

I'll do my best to be accommodating of any illness that interrupts your studies. There is no need to provide details of the illness. If you miss a week or more of work, please get in touch to make a plan for catching up. One of the biggest challenges in math is that once you fall behind, it's difficult to catch up on your own.

3. *What exactly does academic honesty mean?*

In short, that any work you represent as your own, is your own. Much of your work can be done in groups, but not all of it. I will assume that you have access to a calculator, including online tools (like [Symbolab](#)) that give you step-by-step solutions.

Use of these tools is acceptable, but take care that you are not overly reliant on them. What is not acceptable is having someone else do your work for you. This includes tutors, classmates, friends, family members, and online "homework help" sites. If you are paying money in exchange for answers to graded work, you are committing an academic offence.

Penalties for academic dishonesty are outlined in the [Academic Calendar](#). Depending on the severity of the offence, penalties for a first offence can range from a grade of

zero on an assessment, to an F in the courses. Academic offences are also reported to the Dean of Arts & Sciences. They keep a record of each offence, and students with multiple offences can be subject to supplementary discipline.

4. *Does that mean I'm not allowed to get help with my homework?*

Not at all! But keep in mind that your course instructors will be available for help, free of charge. (OK, maybe not free of charge, but you've already paid for it with your tuition.) We will be responding on the discussion forum regularly, There will be time to ask questions in every class, and there will be online office hours. The Student Success Centre will also be running free help sessions (details TBA).

Some of you may still decide to pay for tutoring, and that's fine. But you have a duty to disclose sources of help on an assignment, and the individual tests are still tests, even if you won't have someone watching over your shoulder.

You should probably avoid the various paid "homework help" websites. Most of these don't offer help. They offer worked solutions for a price. Getting those solutions won't help with your understanding. More importantly, the people working for these sites are paid (poorly) per solution, and they often provide incorrect and/or badly written work. (We saw plenty of examples of this last Spring, and yes, all those students now have discipline reports on file.)

5. *I missed a test! What do I do? Do I get a zero?*

First, contact me as soon as possible for any missed test. There are *five* tests, and I only count *four* towards your grade. As long as you only miss one test, there is no penalty. This is true regardless of your reason for missing the test.

6. *What if I really wanted to write that test?*

Inform me of this when you contact me to explain your absence. There's no guarantee that I can schedule a makeup test, but I'll try. You're more likely to get a makeup test if you've contacted me in advance.

7. *Do I need a doctor's note?*

No. This wastes health care resources and your time. (That was my answer before the pandemic, and it's doubly so now.) Just email me to say you were sick. However, if you miss more than one test due to illness, we'll need to meet to discuss how to adjust your grade.

8. *I receive learning accommodations. What arrangements can I make?*

First, make sure that you have registered with the University's [Accommodated Learning Centre](#). No need to let me know: they notify me of every student with accommodations.

Some accommodations will look a bit different this year, but exam accommodations such as extra time are still possible.

If there are any adjustments I can make to facilitate your learning, please do not hesitate to get in touch with me. All students deserve an equal opportunity to learn. Note that the HTML textbook is designed with accessibility in mind, and should work with screen readers. However, I regret that we have not had the time (or paid help) necessary to add elements such as alt-text descriptions for images. It's on the to-do list, but that list is long, and growing.

9. *Life intervened and I can't keep up this week. What do I do?*

Send me an email. Extensions are usually granted as long as they're granted ahead of time. Online homework extensions need to be in place before solutions become available. Book an appointment with me as soon as you feel like you're falling behind and I'll do my best to get you up to speed.