

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). 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.

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](https://moodle.uleth.ca)¹ 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](https://www.uleth.ca/services-for-students/health-safety)².

¹moodle.uleth.ca

²www.uleth.ca/services-for-students/health-safety

1.2 Course staff and contact information

My name is [Sean Fitzpatrick](#)³. I can be reached via email at sean.fitzpatrick@uleth.ca⁴.

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.

We will cover the first six chapters of the course textbook. As time permits, we will also look at selected topics from chapters 7 and 8. (Some of these topics may also make excellent project topics.)

1.4 Universal learning accommodations

Although Math 3200 is being offered "fully in-person", and the University of Lethbridge no longer has protections in place to mitigate the spread of COVID-19, we recognize that the risk of contracting this disease remains high. To accommodate students who need to isolate due to an active infection, or students who would prefer to minimize their risk, the following policies will remain in effect for this semester:

1. Math 3200 will be taught in a hybrid format, if needed. For those who want to attend live, but remotely, a Zoom link will be provided. We are a very small class, so this will be done on an as-needed basis.
2. Most of our class time will be used for you to work on problems. This doesn't make for a compelling recording, so I don't expect to record everything. If there are times when I'm presenting material and you want it recorded, please let me know.
3. All assessments can be completed remotely, although you will benefit from being able to talk to me while working.
4. Extensions can be requested for almost any assessment. An online form will be provided for extension requests.

You generally do not need to give a reason for requesting an extension, and documentation will never be required. As in the "real world", most deadlines act as planning

³www.cs.uleth.ca/~fitzpat

⁴<mailto:sean.fitzpatrick@uleth.ca>

guidelines, and when you can't meet one, you ask for more time. This is usually no big deal, unless it happens a lot, in which case we might check to make sure you're doing okay.

Please also note that it's quite likely that I will become ill, or have family members who are ill. None of us want to risk spreading infection to an entire class! In the event that I am sick (but not so sick that I can't teach), classes will be temporarily moved online, via Zoom.

If this should happen, we will do our best to give you plenty of notice, and to minimize disruption, to the extent this is possible.

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](#)¹. 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](#)². The textbook for this course (and many others) is available on our [Open Textbook Server](#)³.

2.2 Scheduled classes

Math 3200 will be delivered in-person, in Fine Arts W565. We meet Monday, Wednesday, and Friday at 11:00 am. 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.

Wednesday and Friday classes will be used mainly for working on assignments, with additional explanations from me as needed. We will alternate between *lab* assignments, which will use the software [GeoGebra](#)⁴, and *proof* assignments, which will focus on writing clear, logically correct proofs of geometric theorems.

¹moodle.uleth.ca

²www.cs.uleth.ca/~fitzpat/teaching.html

³opentext.uleth.ca

⁴geogebra.org

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](#)⁵. 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](#)⁶, by Francis Su.

2.4 Grading scheme

Our assessment principles this year:

- No tests! Bwahahahahaha!!
- 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.

Homework (15%) Each week I will assign some homework questions. These will be either exercises from the textbook, or reading questions I provide. You will choose one question, and post a solution to our discussion forum. You will also need to provide (constructive) feedback on posts from two peers.

Each contribution will be worth 3 points, as follows:

- Any attempt at a solution earns a point, as long as the work submitted is related to one of the questions. Your attempt earns two points if it demonstrates a reasonable effort, even if the solution is not fully correct.
- One additional point is awarded once you've made two comments on other posts. Comments cannot be negative, and they have to be useful to the student whose work you're commenting on. (Writing "Good job!" doesn't count. Pointing out a mistake, or saying why you like a solution, does count.)

We will use Campuswire for this activity, so that you have the option of remaining anonymous to your peers, if you wish to do so.

"Lab" Assignments (30%) Lab assignments will involve using GeoGebra to produce geometric constructions. There will be 7 labs in total, due every other week.

⁵link.springer.com/book/10.1007/0-387-29052-4

⁶www.chapters.indigo.ca/en-ca/books/mathematics-for-human-flourishing/9780300237139-item.html

**Written
Assignments
(30%)**

Written assignments will involve proofs of theorems, and other problem-solving tasks. 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. I know you are probably expecting more concrete guidelines here: a rubric, a word count, a citation style, etc.. But: (a) I wouldn't know what APA style looked like if it hit me in the face, and (b) I want to give you freedom to be creative and come up with something cool.

If you're stuck on coming up with an idea, please book a meeting. The only common requirement for the project is that it should demonstrate an effort at independent learning, beyond what is covered in course. Typically, this is accomplished by citing a few external sources.

Regrading policy: for labs 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 75% 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.

Note that you may only submit corrections for work that has been attempted, so please do not leave any questions blank!

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](#)¹. Campuswire has a number of useful features, like support for mathematical notation, and the ability for students to remain anonymous to their peers.

¹campuswire.com/

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](http://www.symbolab.com/)¹) 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](#)². 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.

¹www.symbolab.com/

²www.uleth.ca/policy/resources/student-discipline-policy-academic-offences-undergraduate-students

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. *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.

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

First, make sure that you have registered with the University's [Accommodated Learning Centre](#)³. 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.

7. *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.

³www.uleth.ca/ross/accommodated-learning-centre