

# Math 1560 Course Outline

Sean Fitzpatrick  
University of Lethbridge

Fall 2023

## Abstract

As you embark upon your study of calculus in this course (Math 1560), you likely have many questions, such as: “What is Calculus, anyway?” and “Is this on the test?” All of these questions (and more!) will be answered in this syllabus.

## 1 Introduction to Math 1560

Welcome to Math 1560, Calculus I. I’m glad you’ve chosen to embark on this journey through a mathematical classic.

Let’s get one thing out of the way before we begin: Calculus I isn’t nearly as bad as its reputation might suggest. Most students who put in the work do well in Math 1560. We will do our best to support you in your learning, and ensure that students continue to do well in this course.

There are many of us in this class, coming from many different backgrounds and situations. I want our classroom to be an inclusive space for all students. 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 Siksikaitapii 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.

Most of your courses, including this one, will be facilitated using the [Moodle](#)<sup>1</sup> learning management system. You’ll want to spend time as soon as you can familiarizing yourself with your course Moodle pages, and plan to check each one on a daily basis.

Transitioning to learning in the university environment is a challenge at the best of times. Doing so while a pandemic refuses to go away will be additionally challenging. Everyone here at U of L will be doing our best to help you through this time.

Don’t hesitate to reach out if you have questions. (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 we’ll try to answer, or to direct you to someone who can.

---

<sup>1</sup>[moodle.uleth.ca](http://moodle.uleth.ca)

There's some [great general advice for first year students](#)<sup>2</sup> on the U of L website, including links to Academic Advising and advice on study skills from the Student Success Centre. Other resources can be found on the University's [Health and Safety website](#)<sup>3</sup>.

## 1.2 Course staff and contact information

Math 1560 is running in two sections for Fall 2023: 1560A and 1560B. Both sections are taught by [Sean Fitzpatrick](#)<sup>4</sup>. (That's me!) I can be reached via email at [sean.fitzpatrick@uleth.ca](mailto:sean.fitzpatrick@uleth.ca)<sup>5</sup>.

Math 1560A has a good time (12 noon) and a terrible room (E690, in UHall). Math 1560B has a great room (SA6008, in Science Commons), and a terrible time (4:30 pm). We can't have it all, I guess.

Tutorials will be coordinated by [Sean Legge](#)<sup>6</sup>, a.k.a. "The Original Sean". Our tutorials are larger than they used to be, but they also have more staff. Sean will be assisted by a graduate student, and for most sections, a senior undergraduate.

## 1.3 Office Hours

Most of you are new here, so you might be wondering, "What's the deal with office hours?" The short version: these are opportunities to meet with me about the course, the university, or whatever, that are helpful for everyone, and used by far too few.

This isn't entirely accurate, but attendance is always lower than one might expect. Office hours are a time when your teachers are agreeing to make themselves available, and give you their undivided attention for whatever questions you might have. (Unless you come with a group of people; then our attention will be divided between you.)

Office hours don't have to be just for help with the course material. You can drop by with philosophical questions, or to ask for advice, or just to chat and make sure you know who you are. And by the way, you absolutely do want to make sure we know who you are. Many of you will get an A in this course. (Many will get an A+.) But it is a big course, with about 250 students. A good grade won't guarantee that we know who you are.

The reason you want us to know you is that in a couple of years, you're going to start to need to ask for references, for scholarships, jobs, or whatever. Or you may want to apply for a job like the ones our undergraduate TAs are doing. The more time your instructors have spent talking to you, the better we'll do at writing you a good letter.

So drop by, introduce yourself, say hello, ask for help, or whatever. The University of Lethbridge is small, but it's not that small, especially when it comes to first year classes. You'll have a better time here if you get to know your faculty.

## 1.4 Universal learning accommodations

Everything is "back to normal" now, with classes fully in-person. But we all get sick from time to time, and there's word of another COVID wave on the way. I will do my best to ensure that you're not penalized if you have to miss class from time to time. Some of you may even find that you don't like the class format, and you can learn better from the textbook. That's fine too. Please feel free to let me know if your needs aren't being met, and I'll do what I can.

The following general accommodations apply to all students.

- Most assessments (the final exam is a notable exception) can be completed remotely. The homework and the unit tests will be done online. Tutorials are in person, but we'll try to accommodate you if this presents an undue burden.

---

<sup>2</sup>[www.uleth.ca/services-for-students/what-do-i-do-if](http://www.uleth.ca/services-for-students/what-do-i-do-if)

<sup>3</sup>[www.uleth.ca/services-for-students/health-safety](http://www.uleth.ca/services-for-students/health-safety)

<sup>4</sup>[www.cs.uleth.ca/~fitzpat](http://www.cs.uleth.ca/~fitzpat)

<sup>5</sup><mailto:sean.fitzpatrick@uleth.ca>

<sup>6</sup><mailto:sean.legge@uleth.ca>

- 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 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 with you to make sure you’re doing okay.

Please also note that it’s quite likely that some of your instructors 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 your instructor is sick (but not so sick that they’re unable to teach), classes will be temporarily moved online.

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.

## 1.5 Course description

This is Math 1560, Calculus I. It’s a first course in calculus, covering limits, derivatives, and integrals of functions of one variable.

We’ll be dealing with all your favourite functions from high school: polynomials, logarithms, exponentials, even trigonometric functions.

- **Limits** tell us about the value of a function near a point. A limit is simulataneously approximate and precise. In fact, most of calculus could be described as “the art of precise approximation”
- **Derivatives** tell us about how a function is *changing* near a point. Most rates of change in the sciences, from speed to population growth, are quantified using derivatives.
- **Integrals** will be defined in the context of calculating area, but they also appear whenever aggregates or averages are being considered.

Both derivatives and integrals are defined using limits, and the two are related in a (possibly) surprising way.

In this course, you should expect:

- More emphasis on:
  - Conceptual understanding
  - Discussion
  - Context (the whole “what is this good for?” routine)
- Less emphasis on:
  - Memorization (because how am I gonna stop you from looking stuff up, anyway?)
  - Routine computational proficiency (let’s be honest: the computer can do this better than us most of the time)
  - High stakes testing

The course is meant to be done in person, and for best results, on the schedule that will be laid out in Moodle. But please do not come to class if you’re sick. Accommodations are available; see [Subsection 1.4](#).

## 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](#)<sup>1</sup>. 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.

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 [Sean Fitzpatrick's personal website](#)<sup>2</sup>. The textbook for this course (and many others) is available on our [Open Textbook Server](#)<sup>3</sup>.

## 2.2 Scheduled classes

This year's classes are as follows:

- Math 1560A**    Tuesday and Thursday, 12:00 - 1:15 pm, in E690.  
**Math 1560B**    Tuesday and Thursday, 4:30 - 5:45 pm, in SA6008.

We will be using a **team-based learning** (TBL) approach for the course. The TBL cycle works as follows:

1. The course will be divided into 4 units.
2. The first class of each unit consists of a “**readiness assurance process**”:
  - You will be given a list of prerequisites needed to understand the unit, and resources to review those prerequisites.
  - Class will begin with an “individual readiness assurance test”. This will be a multiple choice test to check your understanding of the prerequisite material.
  - This test is immediately followed by a “team readiness assurance test”. The team test is identical to the individual test, but done in teams.
  - Once the team test is complete, teams will be asked to report their results, and we will discuss any areas where further review might be needed.
3. Note that there are *no marks* associated with the readiness assurance tests. They are strictly diagnostic. However, you will be asked to complete a brief reflection after each one, and you will earn credit (i.e. free marks) for doing so.
4. The remaining classes for each unit will consist of working on problems in teams. Problems will be presented in class, one at a time. For each problem, there will be time to work on it in teams, followed by time for discussion.

---

<sup>1</sup>[moodle.uleth.ca](http://moodle.uleth.ca)

<sup>2</sup>[www.cs.uleth.ca/~fitzpat/teaching.html](http://www.cs.uleth.ca/~fitzpat/teaching.html)

<sup>3</sup>[opentext.uleth.ca](http://opentext.uleth.ca)

5. In-class problems are again *not for marks*. They replace the usual lecture-based instruction. Students are welcome to use the textbook (and the videos it contains) to prepare in advance, or to review after the fact, but the readiness assurance process and in-class problems are meant to be sufficient for a student to learn the material.

There is also a weekly *tutorial*. Tutorials take place on Wednesday, at 8 am, 11 am, 1 pm, or 3 pm, depending on your section.

You will use tutorials to work on the basic computational skills essential to success in calculus. Tutorial assignments can be done in groups, and grading will focus on feedback. In some weeks, you will be introduced to some computational tools such as Python or GeoGebra. See [Section 7](#) to see which weeks these are, so you know when to bring your laptop, if possible.

## 2.3 Course textbook

Our course textbook is APEX Calculus, by Greg Hartman. This book is an **open education resource** (OER). That means that the book is fully free, both in terms of cost, your freedom to use and share the book however you see fit.

The book is available in both HTML and PDF formats. The [HTML version](#)<sup>4</sup> is recommended, as it has some nice interactive features, and works well on any device, including smartphones. The PDF is available in black and white (if you want to print it) and colour (if you want electronic access to an offline copy of the book).

## 2.4 Grading scheme

Traditionally Math 1560 has been a mostly skills-focused course: the focus was on learning how to compute limits and derivatives, and the tests mostly checked your proficiency in these skills. Our course will still cover these skills, through the online homework and tutorials. However, tests will focus more on conceptual understanding and problem solving, and our activities during class will be geared toward this approach.

The various graded components of the course are explained below. At first it will seem like there's a lot to do! But most items are small, and many can be done during class time.

|  |   |
|--|---|
| <b>Tutorials (15%)</b>                 | Every tutorial will involve an assignment to be completed. You will be encouraged to work on these problems (and submit) in groups. Evaluation will be strictly <i>formative</i> : you will receive feedback on the work that you submit, and a grade of 1 or 2.<br>A grade of 2 indicates that you have done the work correctly, or that any errors are minor, and don't indicate misunderstanding. A grade of 1 indicates that you've made mistakes that need to be corrected. We will do our best to return your feedback prior to the next tutorial. If you received a grade of 1, you will then have an opportunity to submit corrections. This can be done on paper, or during office hours. Successful submission of corrections will increase your grade from 1 to 2. |
| <b>Online Homework (15%)</b>           | The homework, like tutorial, will focus on building fluency with the computational procedures of calculus. You can expect a new problem set every week. Homework will be delivered through the <b>WeBWorK</b> online homework system. See <a href="#">Subsection 4.1</a> for details.   |
| <b>Readiness assurance tests (10%)</b> | As mentioned above, you will not directly receive a mark for the tests administered during the readiness assurance process (RAP). However, after each RAP you will be asked to complete a short reflection that will be graded for completion.  |

---

<sup>4</sup>[opentext.uleth.ca/apex-standard/part-calculus-I.html](http://opentext.uleth.ca/apex-standard/part-calculus-I.html)

- Unit Tests (30%)** Each of the four units will conclude with a test. The test will be open book. There will be a time limit, but you will have some flexibility in terms of when you choose to begin.
- Final exam (30%)** There will be a standard, cumulative final exam during the exam period. The exam will be in person, but you will be allowed to bring a formula sheet and a calculator.

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 1560**

|        |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|
| A+     | A     | A-    | B+    | B     | B-    |
| 97-100 | 92-96 | 90-91 | 86-89 | 80-85 | 76-79 |
| C+     | C     | C-    | D+    | D     | F     |
| 72-75  | 65-71 | 62-64 | 58-61 | 50-57 | 0-49  |

## 2.5 Other grading policies

- Due dates** most due dates are flexible, and provided primarily for your benefit, to help with planning. (A course without deadlines can be a disaster for those who procrastinate.) One exception is the workshop activity before each test. Because we can't begin the peer review portion of the workshop until the submission deadline passes, we have to have a deadline for the activity to proceed.

A due date extension request form will be available via Moodle. If you need more time to complete an assessment, simply fill out the form. Unless you are contacted to say otherwise, you can assume that your request has been granted.

**Revisions** For both unit tests and tutorial assignments, you will be invited to submit revisions for any incorrect work. Revisions must be submitted within *one week* of receiving your feedback. Tutorial revisions can be handed in during the following week's tutorial. On any tutorial assignment, satisfactory revisions will raise your score to 100%. For test revisions, there will be a submission form available on Moodle. You may choose any *one* question on which you did not receive full marks, and submit a revision to your work. Note that you cannot revise a question that was left blank. There must be original work on which you received feedback for you to submit a revision. Your revision must contain not only corrected work, but also a reflection on your original work:

- What was incorrect on your previous attempt?
- What factors contributed to getting the question wrong?
- What have you learned in the meantime that changed your understanding of the question?

Your grade on the revised attempt will replace your original grade on that question.

Note that you will not be able to submit revisions for the fourth test, since we will not be able to have feedback returned to you before the end of the semester, and we cannot ask for term work to be submitted during the exam period.

**Dropping  
lowest grades**

For tests, tutorials, and online homework, your lowest two grades will be dropped. If you are unable to write one of the tests during the scheduled test window, please let me know and I will try to reschedule it for you. If you miss a test completely, it will count as the lowest grade that is dropped.

### 3 Communication

The following communication channels are available in this course:

1. *Forums.*

There will be a primary course Q&A forum using [Campuswire](#)<sup>1</sup>. A registration link and PIN code will be provided on Moodle. If you do not want to use your U of L email, we can send you an invite to a different address.

Some reasons we like Campuswire:

- (a) Students can choose to remain anonymous (to their peers) when asking a question.
- (b) You can set up chat rooms, either public or private, dedicated to specific topics.
- (c) You can create a *live room* with support for video chat.

The Campuswire forum should be your primary communication channel. In particular, any questions about homework and course content should be asked on Campuswire, since I can reply there with mathematical notation. You will also get a much faster reply on the forum than you will from email.

There is one exception: in our WeBWorK online homework system, there is an “Email Instructor” button you can click to send feedback. This is useful if you think there’s

---

<sup>1</sup>[campuswire.com/c/GE9D3AEF8/feed](http://campuswire.com/c/GE9D3AEF8/feed)

an error in the question, or if you've tried it several times and can't figure out why you're wrong. See [Subsection 4.1](#) for details.

## 2. *Email.*

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

# 4 Technology elements

To facilitate online teaching, our course will rely on several technological solutions. This section provides details on navigating the technology.

## 4.1 Online homework

Online homework is delivered via WeBWorK. WeBWorK is an open source homework system that I maintain on a local server. This service is provided to you free of charge, and your data never leaves campus. <sup>1</sup>

The value of WeBWorK is that questions are automatically graded, providing you with immediate feedback on your work. This is an excellent source of guided practice.

*To access WeBWorK:* simply click the relevant link in Moodle. You will be signed in automatically — there is no user name or password. But keep in mind that if your session times out due to inactivity, you have to return to Moodle to log in again.

*Submitting answers:* WeBWorK has an automatic preview feature. The mathematics in your answer will be rendered as you type. (You can turn this off in the user settings if you don't like it.) If everything looks good, click the Submit button. The system will immediately respond with "Correct" or "Incorrect". If your answer is correct, there is nothing more to do: your answer has been recorded, and you have credit for that problem. If your answer is incorrect, you get to try again. (*Exception:* you typically do not get unlimited attempts for true/false and multiple choice questions.)

*Other notes:*

- Some questions are "scaffolded" — there are multiple parts, and you need to complete one part before being allowed to access the next. For these, you want to click the Preview Answers button, rather than Submit, to check your work and move on to the next step.
- If you need to include scientific units in an answer, the automatic equation rendering can cause trouble. There's a little tool bar on the right hand side that lets you switch to *text mode* to enter units.
- At the bottom of each page is an "Email Instructor" button. If you are stuck on a problem, or if you think there is an error in the programming (it happens!) you can use this to let me know. WeBWorK will send me an email with your message, along with a link to the exact version of the problem you were working on. Often I can figure out where you're going wrong by looking at your answer.

Please *do not* use the email button to ask me how to solve a problem. That's what the discussion forum is for. It should only be used after you've made several attempts at the problem, or if you see an error message of some sort.

Finally, some general advice: WeBWorK is not a new addition for the online environment. I've used it for awhile. The students who do well in this course are the ones who start their problem sets early. Please do not wait until the due date to begin: it leaves you no time to

---

<sup>1</sup>Okay, this is not entirely true. Since faculty sometimes work from home, your data does travel from campus to my house via the university VPN.



ask questions! The most effective way to use WeBWorK is to read the relevant portion of the textbook, try the problems, and then ask for help on the ones you're stuck on.

Oh, and please do not wait until you've made 50 unsuccessful attempts at a problem to ask for help. If you haven't figured out a question after 5 or 6 attempts, set it aside, and come back to it a bit later. If you still can't figure it out, go the discussion forum.

## 4.2 Crowdmark

Tests and assignments will be submitted through Crowdmark. For tutorials, you will receive a worksheet on paper that you submit at the end of class. This worksheet will be scanned and uploaded to Crowdmark by your instructor. Other assessments will be done remotely, and you will be responsible for uploading the work yourself. Like WeBWorK, Crowdmark is connected to Moodle, so you just have to click a link in Moodle to access your assessment and submit your work. Unlike WeBWorK, Crowdmark lets you do your work using pencil and paper. For ease of reference, I've placed [advice for using Crowdmark](#)<sup>2</sup> on a separate page.

Basic advice:

- Start each question on a clean sheet of paper.
- Use a scanner, or a scanning app on your smartphone. PDF is best, but JPG and PNG files are also supported.
- When you submit, make sure your pages are in order, and rotated correctly.

## 5 Course policies (an FAQ)

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

### 1. *What calculator should I buy?*

Unless you already own one, or need it for another class, don't waste your money on a graphing calculator. There are websites/apps like [Desmos](#)<sup>1</sup> that are free, and much more powerful (and user-friendly) than a graphing calculator.

During unit tests, you are welcome to use an online calculator, although I will try to design the tests in a way that makes them unnecessary.

For the final exam, you may bring whatever calculator you own, as long as it is not internet-connected. (No laptops or smartphones on the final.) A calculator will not be needed, but many people feel better having one nearby.

### 2. *This week is super busy and I don't think I can finish the homework on time. Can I have an extension?*

Yes. There's a form for that, provided on Moodle. I don't need to know why you need the extension; just what you want extended, when you want it extended to, and whether you need anything from me to help complete the work.

### 3. *I'm really not comfortable with this whole team thing. What can I do?*

The team-based discussions are a learning tool, with a lot of very good evidence to support their effectiveness. But they are an alternative to lecture, and not part of the assessment. If you can learn better by working on your own, you can. You might find that the classes are not as useful to you, but the textbook is a great resource, and you can always meet during office hours to ask questions one-on-one.

---

<sup>2</sup>[www.cs.uleth.ca/~fitzpat/crowdmark.html](http://www.cs.uleth.ca/~fitzpat/crowdmark.html)

<sup>1</sup>[www.desmos.com/](http://www.desmos.com/)

4. *What happens if I get sick?*

First and foremost, do not come to class! 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.

5. *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 software (like [Symbolab](#)<sup>2</sup>) 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 submit work that somebody else did for you, you are committing an academic offence.

Penalties for academic dishonesty are outlined in the [Academic Calendar](#)<sup>3</sup>. 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.

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

Not at all! Working with classmates on your homework is a great way to learn. 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.)

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

First, contact us as soon as possible for any missed test. There are *four* tests, and I only count your best *three* 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.

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

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

9. *What about the final exam?*

If you are unable to write the final exam, you will need to contact Academic Advising. They are responsible for authorizing rescheduling of exams. Usually if you miss an

---

<sup>2</sup>[www.symbolab.com/](http://www.symbolab.com/)

<sup>3</sup>[www.uleth.ca/policy/resources/student-discipline-policy-academic-offences-undergraduate-students](http://www.uleth.ca/policy/resources/student-discipline-policy-academic-offences-undergraduate-students)

exam due to illness, an incomplete grade is recorded. You will write a makeup exam at a later date, at which point your grade will be updated.

10. *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.

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

First, make sure that you have registered with the University's [Accommodated Learning Centre](#)<sup>4</sup>. 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, 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.

12. *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.

## 6 Learning outcomes for Math 1560

This page outlines the list of competencies each student is expected to achieve in Math 1560. There are five "big themes," corresponding to the five chapters of the textbook. (The number following each outcome below indicates the corresponding textbook section.) The online homework, tutorial assignments, and tests are all designed to help you achieve these outcomes.

By the end of the course, you should be able to:

### Chapter 1: Limits and continuity

1. Explain the concept of a limit using graphical and numerical information. (1.1)
2. Apply limit laws in an abstract setting (explicit functions not given). (1.3)
3. Use algebraic (or trigonometric) manipulation to evaluate limits. (1.3)
4. Algebraically and graphically determine one-sided limits of piecewise-defined functions. (1.4)
5. Understand the meaning of continuity, both precisely and intuitively. (1.6)
6. Understand and apply the **Intermediate Value Theorem**. (1.6)
7. Evaluate limits involving infinity and determine asymptotic behaviour of a function. (1.5)

### Chapter 2: Derivatives

---

<sup>4</sup>[www.uleth.ca/ross/accommodated-learning-centre](http://www.uleth.ca/ross/accommodated-learning-centre)

1. Understand and apply the limit definition of the derivative. (2.1)
2. Understand the practical meaning of the derivative in terms of rates of change. (2.2)
3. Understand and apply derivative rules (sum, constant, power, product, quotient). (2.3, 2.4)
4. Calculate derivatives using the chain rule. (2.5)
5. Understand and apply implicit and logarithmic differentiation. (2.6)
6. Understand inverse functions and their derivatives. (2.7)

#### Chapter 3: Graphical behaviour of functions

1. Determine maximum and minimum values of a continuous function on a closed interval. (3.1)
2. Understand the significance of the **Mean Value Theorem**. (3.2)
3. Understand the relationship between the first derivative and the shape of a graph. (3.3)
4. Use the second derivative to determine concavity, and understand its significance. (3.4)
5. Produce an accurate sketch of the graph of a function without the use of technology. (3.5)

#### Chapter 4: Applications of the derivative

1. Solve word problems involving related rates of change. (4.2)
2. Solve word problems involving optimization. (4.3)
3. Use linear approximations to estimate function values. (4.4)
4. Compute the Taylor polynomial of a function to a specified degree. (4.5)
5. Understand the practical significance of differential calculus.

#### Chapter 5: Integration

1. Compute antiderivatives and solve initial value problems. (5.1)
2. Understand and apply properties of definite integrals. (5.2)
3. Understand the Riemann sum definition of the integral, and use it to approximate an integral. (5.3)
4. Use Part I of the FTC to compute derivatives of functions defined as integrals. (5.4)
5. Use Part II of the FTC to evaluate simple definite integrals. (5.4)
6. Use the method of substitution to evaluate definite and indefinite integrals. (6.1)
7. Set up and evaluate a definite integral to compute area between curves. (5.4)

## 7 Course schedule

I will attempt to follow the schedule below, bearing in mind that some adjustments are always needed. Numbers below refer to textbook sections.

A tutorial is marked as a “lab” if there is a computer component. “RAP” refers to the Readiness Assurance Process days.

Online homework assignments will be due Tuesday. Tests will open Thursdays at 6 pm (after Math 1560B meets) and close Fridays at 11:59 pm. Opening dates for tests will be Sept. 28, Oct. 26, Nov. 23, and Dec. 7.

Each test covers one unit, as follows:

- Unit 1 covers Sections 1.3 – 1.6 and 2.1
- Unit 2 covers Sections 2.3 – 2.7
- Unit 3 covers Sections 3.1, 3.3 – 3.5 and 4.2 – 4.5
- Unit 4 covers Sections 5.1 – 5.4 and 6.1

**Table 7.1 Schedule for Fall 2023**

| Tuesday              | Wednesday (tutorial)                | Thursday                    |
|----------------------|-------------------------------------|-----------------------------|
|                      | Sept. 6: No tutorial                | Sept. 7: Syllabus and Intro |
| Sept. 12: RAP 1      | Sept. 13: Lab 1                     | Sept. 14: 1.1 and 1.3       |
| Sept. 19: 1.4        | Sept. 20: evaluating limits         | Sept. 21: 1.5               |
| Sept. 26: 1.6        | Sept. 27: continuity and asymptotes | Sept. 28: 2.1               |
| Oct. 3: RAP 2        | Oct. 4: Lab 2                       | Oct. 5: 2.3                 |
| Oct. 10: 2.4         | Oct. 11: derivative rules           | Oct. 12: 2.5                |
| Oct. 17: 2.6         | Oct. 18: chain rule and implicit    | Oct. 19: 2.7                |
| Oct. 24: RAP 3       | Oct. 25: Lab 3                      | Oct. 26: 3.1 and 3.2        |
| Oct.31: 3.3 and 3.4  | Nov. 1: Curve sketching             | Nov. 2: 4.2                 |
| Nov. 7: 4.3          | Nov. 8: word problems               | Nov. 9: 4.4 and 4.5         |
| Nov. 21: RAP 4       | Nov. 22: Lab 3                      | Nov. 23: 5.1                |
| Nov. 28: 5.2 and 5.3 | Nov. 29: area and antiderivatives   | Nov. 30: 5.4                |
| Dec. 5: 6.1          | Dec. 6: no tutorial                 | Dec. 7: Review              |