MAT135H1: Calculus 1(A)

University of Toronto Fall 2018

> *The calculus was the first achievement of modern mathematics and it is difficult to overestimate its importance. I think it defines more unequivocally than anything else the inception of modern mathematics.* – John von Neumann

In the 17th century, two mathematicians – German Gottfried Leibniz and Englishman Isaac Newton – simultaneously discovered an intimate connection between two seemingly unrelated problems: measuring changing quantities and finding areas of curved shapes. This discovery formed the basis of calculus, a subject which stands as one of the most important fields of mathematics today.

Calculus has earned its reputation because it provides us with tools that can be applied to solve problems in every branch of science that would be impossible to answer without it. For example, calculus allows us to easily find the greatest possible profit or land size under given conditions, to accurately model how a population grows or a disease spreads, and to compute quantities like work and centre of mass with ease. Calculus is not only important for its applications: it is significant because it allows us to come to grips with the infinite.

In this class, we will study *differential calculus*, the branch of calculus that is motivated by the problem of measuring how quantities change. We will focus on understanding why the tools of calculus make sense and how to apply them to the social, biological, and physical sciences.

Contents

General Course Information

> *As long as you're alive, you can always have a new start. I'm not really different from anyone else except for my willingness to keep trying.* – Carla Cotwright-Williams

Key Dates

Last day to add or make section changes	September 19
Thanksgiving (no classes)	October 8
Term Test	October 17 6:00-8:00 PM
Last day to cancel courses without academic penalty or change credit / no credit option	November 5
Derivative Computation Quiz	November 1–14 (in tutorial)
Fall Reading Week (No classes)	November 5-9
Last Day of Classes	December 5
Makeup Monday (for missed Thanksgiving classes)	December 6

Also see for weeks when the Applied Communication Tasks will be due in tutorials.

Website and Email

The course website is located on Quercus, at `q.utoronto.ca`. It will contain information and course resources, including office hours, tutorial information, homework, assessments, test review packages, and important announcements.[1] **You are responsible for checking it daily**. We will also send important announcements via Quercus, and recommend that you update your notification settings so that all announcements are emailed to you.

The University has a policy requiring that students have a U of T email address and that you check it regularly. Instructors and TAs will only respond to emails sent from your official U of T email address, so be sure to use it when communicating with them.

Textbook and Software

The required textbook for MAT135 is *Calculus: Single Variable*, 7th edition by Hughes-Hallett et al; it will also be used for MAT136 in the Winter of 2019. This textbook is available in a package at the U of T Bookstore (214 College Street) in either a physical loose-leaf or enhanced e-text form; either form is acceptable for the course, but you must use the 7th edition.[2] Note that this is a different text than what was used last year for MAT135/136.

Graphing will help you check your answers to homework problems and prepare your solutions to the Applied Communication Tasks. The open-source software *Geogebra* is a good free option, and will be used by many instructors for in-class demos. You can download it from `www.geogebra.org/download` for free. The desktop application 'GeoGebra Classic' is the most versatile option, but there is also a graphing calculator app for mobile devices available. Your instructor might ask you to bring a laptop of phone with the app to class.

Finally, all lecture sections will be using the classroom response system Top Hat to record votes to in-class questions. If you are taking MAT136 next semester or other courses that use Top Hat, you should sign-up for a year-long subscription as it is more cost effective than purchasing it term-by-term. For sign-up instructions and codes, see the Top Hat instructions posted on the course website.

[1] Quercus is the UofT name for Canvas; if you need help with a topic related to Quercus, you should do a search for Canvas.

[2] We recommend the physical, loose-leaf copy but know that many students prefer to have an electronic copy.

What you will learn in MAT135H1

There is a difference between not knowing and not knowing yet. –Sheila Tobias

Learning Goals

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

- understand, use, and translate between multiple representations of functions, limits, and derivatives
- solve complex and novel problems using tools from calculus
- build a mental framework of calculus that serves as a foundation for future learning
- see yourself as a confident and capable user and communicator of mathematics
- possess skills and habits for effectively learning math

More specific Learning Objectives are included on each homework set and tutorial assignment.

Essential Questions

In this course we will address the following questions.

- Why should we represent a single relationship in different ways?
- What is infinity? What is an infinitesimal?
- How do we model the real-world with mathematics?
- What is speed, and how do you measure it? What are rates, and how do you measure them?
- How can you solve novel problems that are unlike any youve encountered before?
- What do good readers and writers of math do?

Course Units

We will work through the following units in MAT135, corresponding to the textbook sections below.

1. Modelling with Functions: How do we use mathematics to describe related quantities? §1.1–1.6
2. Limits: How do we work with the infinitely small and the infinitely large? §2.1; §1.7–1.9
3. The Derivative: In what different ways can rates of change be represented? How are rates of change described and used? §2.2–2.6

4. Computing Derivatives: How are derivatives efficiently computed? §3.1–3.7

5. Using the Derivative: How can we use the derivative to solve complex problems from the sciences? §3.9; §4.1–4.4; §4.6–4.7

6. The Area Problem: How is the rate of change problem related to the area problem? §5.1–5.3

Is MAT135H1 the right calculus course for you?

> *Math is a human activity that every sort of people, at one time or another in history, has engaged in.* – Fern Hunt

Are you prepared for MAT135H1?

Research has shown that students who come into a calculus course with strong knowledge of algebra and functions perform far better than students who have weaker skills. Further, students who work to improve their pre-calculus and mathematics study skills attain greater mastery of calculus.[3] Recent research shows that "success in calculus... comes from having a strong foundation."[4] Algebra and functions are two important tools that you will use every day in calculus, and being able to work with them accurately and efficiently will make it much easier to tackle calculus.

The prerequisite for MAT135H1 is high school level Calculus. This prerequisite is intended to ensure that you have a strong knowledge of algebra and functions prior to the course. You do *not* need to know calculus topics (such as limits, derivatives, and integrals) prior to the course. To determine if you are ready to take MAT135, it is important for you to review algebra and functions.

To assess whether you are ready for MAT135, complete the following self-assessments on the Preparing for Calculus website at `http://www.math.toronto.edu/preparing-for-calculus/`:

- Algebra
- Inequalities & Absolute Values
- Functions, Inverses, Exponentials, & Logarithms
- Polynomials and Factoring
- Graphing
- Geometry
- Trigonometry

This website also contains tutorials and examples related to these topics.

It will be very difficult to work on the review material throughout the semester. If you have not yet mastered the content on the Preparing for Calculus website, we *strongly* recommend that you speak with your advisor about taking calculus after you have had the opportunity to master precalculus.

[3] For example, see *Algebra and Precalculus Skills and Performance in First-Semester Calculus* by Agustin and Agustin and *Teaching Calculus Students How to Study* by Boelkins and Pfaff.

[4] https://news.harvard.edu/gazette/story/2018/07/masters-of-calculus-come-prepared-harvard-study-shows/

Alternative Calculus Courses

MAT135H1 is the first in the sequence of calculus courses for students intending to major in science, and is the prerequisite for MAT136H1. Other calculus courses offered by the Faculty of Arts & Sciences include MAT133Y1, MAT137Y1, and MAT157Y1.

- MAT133Y1 introduces students to both calculus and linear algebra and is intended for Commerce students. It does not cover as much calculus as MAT135H1 and MAT136H1, and is not a valid prerequisite for most math and statistics courses.
- Both MAT137Y1 and MAT157Y1 are proof-based approaches to calculus, intended for students who are planning to take further mathematics courses. These courses go further into the mathematical basis of calculus, whereas the MAT135/MAT136 sequence will focus more on applications.

Breadth & Distribution Requirements

This course satisfies 0.5 credits of the Science distribution requirement and the Physical and Mathematical Universe Breadth requirement.

Assessment

> *While grades are (one) measure of progress, they are not a measure of promise.*
> –Francis Su

Grading

Your final grade will be calculated according to one of the following grading schemes, depending on which one results in a higher grade

Scheme 1	Scheme 2	Assessment
5%	5%	In-Class Responses (Top Hat)
10%	10%	WeBWorK Homework
12%	12%	Applied Communication Tasks
8%	8%	Derivative Computation Quiz
25%	15%	Term Test
40%	50%	Final Exam

For information about how the percentage grade translates into letter grades and grade point values, see the grading scale available at
`http://www.artsci.utoronto.ca/newstudents/transition/academic/grading`

In-Class Responses (Top Hat)

Peer Instruction is one of the activities that we will be doing during lecture. You will be presented with a conceptual problem – often one that is known to be an area of common confusion or misunderstanding – and asked to vote on your answer to the question individually.

After voting, the class will either discuss (if a clear majority of students gets the correct answer) or will take a few minutes to discuss the answer with a partner until you arrive at a consensus.

Research has demonstrated that this technique increases students' conceptual understanding in calculus, supports better retention of knowledge, increases course satisfaction, makes students more likely to complete a course, and increases student engagement.

Your participation and responses to questions will be recorded using the classroom response system Top Hat. 5% of your final course grade will come from your responses to questions in-class, as recorded in Top Hat. You must attend the section you are enrolled in for your participation and responses to count; therefore **you should ensure that you are registered in a section that you can attend**.

Since you may have legitimate circumstances that prevent you from attending class or days when you forget to bring technology to class, your participation grade will be rounded up to 100% for the purposes of your final course grade as long as you participate in more than 80% of classes. (If your participation is between 0% and 80%, it will remain unchanged in the final grade). This generous rounding is meant to account for all excused absences and technological you may have; no other documentation will be accepted. This also applies to students who register in the course after the start of the semester; no additional grades will be dropped for missed classes.

WeBWorK Homework

In order to learn math, you must do math. For each lecture, you will be assigned a homework set with pre-class reading and problems (to be completed before the lecture), and after-class problems (to be completed as soon as possible after the lecture).

The pre-class portion of the homework problems will be completed through the online homework system WeBWorK. It will provide you with instant feedback on how well you have met pre-class learning goals. Here is some information about using the system:

- The WeBWorK homework problems will be available on Quercus.
- You will have an unlimited number of attempts for each problem.
- WeBWorK sets for your lecture section will be due according to deadlines set by your instructor; see Quercus for details.
- The first WeBWorK set is practice and will be ungraded
- To account for sickness, late course additions, technical problems, or other circumstances that may prevent you from completing WeBWorK, 20% will be added to your WeBWorK grade at the end of the term, to a maximum of 100%.
- See *How to Enter Answers into WeBWorK*, posted on the course website, for additional information about how to type mathematics notation
- Do not click the 'Email Instructor' button on WeBWorK; these emails will automatically be filtered into our junk mail and not receive a reply.

Applied Communication Tasks

Applied Communication Tasks will give you the opportunity to develop and demonstrate that you have achieved course learning objectives related to communication and application of calculus. They will help you to develop skill sets that you can use to apply your knowledge of calculus in other situations, and learn additional quantitative material on your own.

There will be three Applied Communication Tasks introduced in tutorials throughout the term. You will work on them both in tutorials and at home, and submit them in tutorial. Your grade in this component of the course will be calculated according to the number of learning objectives that you demonstrate through the completion of the tasks throughout the term.

ACTs will be due in tutorials, so the exact due date will depend on when you have your tutorial; the weeks are shown below.

ACT A Draft	Sept 21–27
ACT A Final	Sept 28–Oct 3
ACT B Draft	Oct 11–17
ACT B Final	Oct 25–31
ACT C Topic	Nov 15–21
ACT C Draft	Nov 22–28
ACT C Final	Nov 29–Dec 5

You may be required to submit a course assignment to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their assignments to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the Universitys use of the Turnitin.com service are described on the Turnitin.com web site.

Derivative Quiz

While MAT135 is focused primarily on solving problems it is also important that you develop computational fluency.

Between November 1 and 14, you will write a 30-minute computer-based derivative computation quiz in your tutorial. You must bring a device with you to class that day from which you can access WeBWorK. A link to practice quizzes will be posted on the course website ahead of the quiz; you will be able to practice it unlimited times ahead of the in-class quiz. Your grade will not be recorded if you write it in a section you are not enrolled in.

If you are unable to write the quiz due to sickness or other emergency, your Derivative Quiz component of your grade will be reallocated to your Final Exam.

Term Test and Final Exam

The Term Test and the Exam are common to all sections of MAT135 and will primarily consist of problems. Your solutions to these problems will be graded for both correctness and clarity. For many problems, it will not be enough to simply produce a correct final answer: you will need to show how you arrived at your answer by providing a complete solution. Likewise, you may still receive partial marks even if you do not arrive at a correct final answer but

demonstrate an understanding of the key ideas or progress towards the correct answer. Not all questions will be of equal difficulty or be worth the same number of points. There will also be some questions that do not require an explanation, such as true/false or multiple choice questions. When an explanation is *not* required, it will be clearly marked in the problem.

The questions on the Term Test will be based on the Learning Goals and Objectives given on each homework set. In this course, you will be assessed based on your mastery of these learning objectives, not against other students in the class. Therefore your grades will not be 'curved' up or down: as instructors, we would be delighted if the average was "high" and a large portion of our students displayed mastery of the content! Since we are measuring your performance against these set criteria, we will not be releasing average grades or other information about how the class as a whole performs. According to Dr. Jay Parkes, an renowned expert in college assessment "releasing class-level performance data is not only irrelevant but it draws students' focus away from their individual mastery of learning objectives to how their mastery compares to others."

Term Test and Exam cover sheets and sample problems will be posted prior to the test so that you can familiarize yourself with the specific instructions and style of problems. The sample problems posted will be more indicative of what you can expect on the Term Test and the Exam than MAT135 exams from Fall terms prior to 2017. Further details on the administration of these assessments will be given in lectures.

Academic Integrity

Academic integrity is fundamental to learning and scholarship at the University of Toronto and beyond. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves. Violating standards of academic integrity will prevent you from learning material, refining your problem-solving skills, and developing self-sufficiency and self-esteem.

The MAT135 instructors and TAs are strongly committed to assigning grades based on our students' honest efforts to demonstrate learning in this course. Academic dishonesty in any form will thus not be tolerated in this course.

Students are expected to know what constitutes academic integrity: familiarize yourself with the information available at (`http://www.artsci.utoronto.ca/osai/students`). It is the rule book for academic behaviour at the U of T. Potential offences include, but are not limited to:

- Bringing notes or hints into a term test, quiz, or exam, including notes on your hand or on a piece of paper
- Having another student write a term test, quiz, or exam for you, or impersonating someone else in writing one of these assessments
- Allowing someone else to complete your WeBWorK homework problems, or completing it for someone else
- Falsifying Applied Communication Task records or taking unattributed text from somewhere else

- Replying to Top Hat questions remotely
- Looking at someone else's answers on a test or exam
- Communicating with another student during a quiz, term test, or exam
- Submitting fraudulent medical notes
- Misrepresenting reasons for being late or absent for a term test, quiz, or exam
- Submitting an altered test or assignment for re-grading
- Violating test, exam, or quiz procedures

The following actions are *not* offences in this class.

- Discussing questions from homework with classmates, building off of each others' ideas
- Using online resources to help you understand the content of the course or homework problems

In accordance with the University's Code of Behaviour on Academic Matters, we will actively investigate any suspected cheating, plagiarism, misrepresentation or other dishonest practices. The consequences for academic misconduct can be severe, including a failure in the course, a notation on your transcript, suspension, and expulsion.

If you have any questions about what is or is not permitted in this course, please do not hesitate to contact your instructor or TA. Students are usually reluctant to report incidents of academic dishonesty. As we are working together to preserve the fairness of this course, we encourage you to let us know (anonymously, if necessary) if you observe behaviour that you feel might be unethical. Your name will be held in confidence.

Grading

We will be using the platform CrowdMark for grading in MAT135. Using this platform helps increase fairness and efficiency. When an assignment has been graded you will receive a URL via email where you can view your original assignment and the grader's comments and grades. All grading is done by TAs and instructors in MAT135.

Course Activities

> *You have to spend some energy and effort to see the beauty of math.* - Maryam Mirzakhani

Preparing for Class

The homework for each class will consist of readings and several problems.

Your personal notes on the assigned readings and problems should contain enough detail to be easily understood by you at a later time. For example, you will want to refer to these problems when preparing for the Term Test, and the Final Exam. While you do not need to write your solutions in complete sentences, they should be easy to follow and clear.

Reading

You will be assigned readings to prepare for each lecture. Lectures will help to clarify important or confusing parts of the reading, but will not recap every aspect of the reading. Completing the reading before each lecture is important to fully benefit from lectures.

Why should you read *before* class rather than after class or when you are studying for an exam? It leaves room during the lecture for the most important learning activities. 36 hours is not enough time to cover all of calculus in depth. By coming to a lecture with a basic understanding of the material, you will be able to focus on the big questions that are difficult to learn on your own, such as how the content fits into the broader narrative of calculus, points that students typically find confusing, and common misconceptions.

The ability to understand mathematical texts is an important skill for *any* future mathematical study. This skill is vital for at least three reasons.

1. **Future Learning**. When you need to learn a mathematical concept on your own, your main resources will be written.

2. **Efficiency**. In an ideal world we might try to discover mathematics itself, but this would be impractical. Calculus, for example, took hundreds of years to develop and another 200 years to gain a firm footing. The great abundance of mathematical writing available allows us to learn from the experts.

3. **Learning to Communicate**. Just as reading many stories makes you a better storyteller, reading a lot of mathematics makes you a better mathematical communicator.

Additional tips for getting the most out of reading your math textbook are posted on the course website.

Problems

Problem solving is at the heart of mathematics, and allows us to apply our knowledge of math to science, social science, and beyond. Developing problem solving skills is just as important as the content that we will be covering, and can be used as you work through courses in any major or pursue any profession. Throughout this course, you can expect to encounter many unfamiliar problems from math and beyond, and it won't always be clear right away how to apply the course content to solve these problems.

The problems on homework will be of varying difficulty: some will be easy warm-ups to the reading or simple computations, while others will involve complex situations and require problem solving skills. The pre-class portion of the homework will be completed and submitted via WeBWorK; the after-class portion of the homework will not be collected but form a vital part of your learning. Solutions to the problems will be available on the course website approximately one week after the assignment is completed.

Lectures

You will attend three hours of lecture each week of the course. Each lecture is taught by a course instructor.

The lectures of this course will support your learning of calculus in a number of ways. During lectures, we will motivate new material, clarify difficult concepts, test your understanding of calculus prior to the major assessments, and give you the opportunity to meet with fellow students. You should come prepared to not only hear about math during lectures, but to think and engage with math. While your instructor will use some of the lecture time to explain the material, you may also be expected to actively engage in learning by working on problems, discussing ideas with your fellow students, and sharing your thinking with the class.

The more you prepare for and engage in class, the more you will get out of it. The following are basic guidelines for ensuring that you and your classmates get the most out of class.

- Be sure not to speak when someone else is speaking during class. While it might seem as though no one notices, even one person whispering in the back of the classroom can be a significant distraction for the entire class, and can side-track learning. If you have a question about the class, pose the question to the entire class - not just to your neighbour.
- Please be on time to class. Coming in late means that you may miss important information and it disrupts the learning of other students.
- Likewise, do not leave late at the end of class or pack up before class has ended. If you *must* leave one class early for an appointment or other special commitment, sit near the door to minimize disruptions.
- Bring pencils, paper, textbook, a scientific calculator, and a device to connect to Top Hat to every class.
- If you use technology during class, make sure that it is always for an in-course use. While it may seem harmless to check your email or a game update, it can be distracting for students around you; research has demonstrated that the learning of students who can see the laptop of another person engaging in off-task behaviour is damaged.

Tutorials

Each week, you will attend one tutorial, a class of about 30 students from across MAT135H1 lecture sections. The purpose of tutorials is to improve your problem-solving and communication skills, and to provide you opportunities to collaborate with other students. You will also be submitting and working on components of Applied Communication Tasks during tutorials. Also be aware that tutorials take priority over other tests, so you should not skip your tutorial to attend a test in another course.

Each tutorial is 50 minutes, starting at 10 minutes past the hour and ending on the hour. **Tutorials will begin on Thursday, September 13.** Be aware that tutorials take priority over other tests, so you should not skip your tutorial to attend a test in another course. If you need to miss a tutorial due to illness or another emergency, you do *not* need to notify your Teaching Assistant. If you miss a tutorial where you are supposed to submit a component of an Applied Communication Task, you must attach official documentation verifying your absence to your assignment submission in the next tutorial.

If you are more than 20 minutes late for a tutorial, you will not be permitted to submit assignments due in tutorials.

Instructors and Teaching Assistants

Instead of looking around and worrying about how many students are 'better' than you, why not look around for someone you can help pull up? –Karen E. Smith

Instructors

The instructors for MAT135 are shown below. Before emailing us, be sure to check the guidelines for asking questions at the end of this syllabus. In particular, note that instructors and TAs will **not** answer questions about course content or questions that can be answered by reading the syllabus via email; such inquiries will be deleted without response.

You are expected to treat all members of the instructional team with respect. Examples of disrespectful behaviour are speaking over someone, using inappropriate language, leaving a tutorial early, or arriving late.

Instructor	**Email**	**Section(s)**
Dr. Chouchkov	dmitri.chouchkov@mail.utoronto.ca	LEC0101
Dr. Mayes-Tang	mayes-tang@math.toronto.edu	LEC0201
Dr. Rajaratnam	kr.rajaratnam@mail.utoronto.ca	LEC0401
Dr. Emory	m.emory@utoronto.ca	LEC0402, LEC0501
Dr. Su		LEC0601
Dr. Richards	larissa.richards@mail.utoronto.ca	LEC0701
Dr. LeBlanc	leblanc@math.toronto.edu	LEC0801, LEC5201
Dr. Nica	mnica@math.utoronto.ca	LEC0901
Dr. Guo	mg.guo@utoronto.ca	LEC1001
Dr. Verberne	yvon.verberne@mail.utoronto.ca	LEC5101

Teaching Assistants

Teaching Assistants ('TAs' for short) are an important part of the teaching team for MAT135H1. TAs are advanced undergraduate or graduate students who are experienced in calculus. They play a number of roles, including:

- leading tutorials
- grading assessments
- answering questions in the Math Aid Centre

How to Succeed in MAT135

In math we have to look at a problem from all directions. If one approach isn't working, then we try another. If the problem is too hard, we find a simpler problem and then come back to the more difficult one after we've solved the first. Every mathematician hits a wall at some point. You have to learn how to get around it, how to keep working on challenging things. Those are all skills that transfer to real life. –Rebekah Yates

Top 10 Tips for Success in MAT135

1. Work with other students and talk about calculus with them
2. Do many problems, and focus on *why* a solution works rather than the final answer
3. After every lecture or tutorial, take 30 seconds to summarize what you have learned
4. Read the assigned textbook reading *before* coming to class and keep up on the assigned problems
5. Instead of re-reading, test yourself on the material by solving additional problems and by explaining it to someone else
6. Use examples as a road map: rather than focusing on the individual steps, think about how they are connected to the overall goal of the problem
7. 'Interleave' your practice: mix up the types of problems, solutions, and approaches as you review rather than only reviewing one section at a time.
8. Do not 'cram': complete reading and homework when they are assigned
9. Think in class: don't be a passive listener
10. Use the free resources available to you as a student of University of Toronto (see the Resources section of this syllabus)

How to improve your problem-solving skills

The key to improving your problem solving skills is to work through many problems. When faced with a new problem, resist the temptation to immediately search the textbook or the web for a similar problem. Instead, start by asking yourself what you know and identifying what the goal of solving the problem is. Problem-solving is all about finding a path between what you know and what you want to know, and developing strategies to build this path is a key to success. You will be discussing specific problem solving strategies during many tutorials.

Working with your classmates can be very valuable in getting past roadblocks and improving your problem-solving skills. Simply discussing a problem with someone else can help you better understand the problem and a solution. Remember that the process of solving the problem is more important than the answer.

How to get the most from lectures

During classes, you may be asked to participate in tasks like thinking about problems, talking to other students, writing a solution, or explaining a concept to the class. By approaching these activities with enthusiasm and doing your best, you will not only help your own learning but also the learning of those around you. In a large class, it is easy to feel as though you are just one in a crowd and that what you do is not noticed by anyone else. However, if you change perspectives and think about how you have been influenced by others in large groups you'll see this isn't true: you notice your neighbour browsing the internet on their laptops,

are distracted by loud coughing fit or cellphone reminder, wonder what a whispering group of people across the room is talking about, or look over when you hear someone packing their bags up. You've probably also experienced the effect of small behaviours spreading in a crowd. When you return to thinking about your own behaviour, you should be able to see why what you do matters to others.

Creating a positive learning environment requires the participation of everyone involved. Your instructor will set a structure and activities to help you learn calculus well. By actively engaging in course activities and working with your classmates, you will not only help your own learning but theirs' as well.

How to use assessments for learning

The Term Test and the Final Exam will help to accomplish the Learning Goals of this course in several ways. For example, they will:

- Encourage you to push yourself to understand difficult concepts and to complete *many* challenging problems
- Help you identify areas where your knowledge and problem solving skills are already strong, and where you still have room to grow
- Work with others to deepen your understanding
- Ensure that you have the necessary foundation for building on your knowledge in MAT135, MAT136, and in courses that require calculus as a prerequisite

There are 3 important phases of the test-learning cycle. They apply to any assessment.

1. **Preparation**: *All* learning activities that you engage in prior to the assessment fall into this category, including reading, completing problems, preparing for and attending lectures and tutorials, working with other students, and reviewing past assessments. It also includes ways of preparing yourself to take a test, such as getting a good night's sleep, scheduling meals and snacks so that you aren't hungry during the test, and exercising so that you have the energy that you need.

2. **Performance**: This is what comes to mind when we think of 'taking a test' or 'completing an assignment'. Make sure that you think about what the test-taking environment will be like and incorporate that into your practice. For example, if you usually study while lying down or with music in the background try to do some practice in a silent environment in a chair similar to that you will be in during the test.

3. **Reflection**: An assessment isn't over when you hand it in! Write some quick notes to yourself about what went well, what didn't go well, and what topics you need to review. Once you receive your test back, review your solutions along with the feedback you received and sample solutions and develop a strategy for better learning the material. There is always room for improvement.

Where to find support

There are several free sources of support available to help you learn calculus.

Working with Peers

One of the best ways to learn math is to work with other students. This will give you the opportunity to explain and talk about mathematical concepts, check your own understanding and avoid overconfidence, and get different perspectives on the course material. To make group study sessions effective, be sure that you discuss how problems are solved or why a solution makes sense, rather than just trading final answers.

It is useful to develop a network of different students to work with: don't be afraid to introduce yourself to others in your class or tutorial sessions and ask if you can trade contact information. It might take several tries to find a study group that works for you, and you might find a variety of study groups successful.

Recognized Study Groups

The Recognized Study Groups Program can help you join or start a study group. It provides a regular study time, gives you the opportunity to meet people from across the University, and you can even receive a co-curricular credit for participating.

Instructor Office Hours

An 'office hour' refers to a period of time (usually 50 minutes or one hour) that an instructor is available to discuss course content and answer questions. In MAT135, these will be 'drop-in hours'.

You may attend the office hours of any instructor in the course. If they are speaking with another student, feel free to come in and listen. You do not need to make an appointment, but please come to office hours prepared with questions, your notes, textbook, and any other materials you might need.

See the course website for office hour locations and times.

Math Aid Centres

The main Math Aid Centre is located in the Physical Geography building (PG), Room 101. During times listed on the Office Hour Calendar, TAs for MAT135 will hold office hours there. We encourage you to also use the Math Aid Centre to work with other students in the course and to meet new classmates. When you come to the Math Aid Centre, please bring specific questions, your textbook, homework assignments, and any other material you may want to refer to. If the TA is speaking with another student, please join them at the table and listen to the discussion.

College-specific Math Aid centres are also available at several Colleges. See `http://www.math.utoronto.ca/cms/math-aid-centres/` for more information.

The schedule for Math Aid Centre office hours will be posted online, with the other office hours of the course.

Academic Success Centre

The Academic Success Centre offers a wide variety of services and programming to help students meet their academic and personal goals at the University. Individualized learning skills consultations are available by appointment, or on a first-come, first-served basis for

drop-in visitors. You can reserve private study space, attend workshops and lectures related to academic success, or consult their library of helpful publications about best learning practices. More information can be found on their website, `https://www.studentlife.utoronto.ca/asc`.

Additional Support Services

Other free support services, such as English Language Learning programs and College-Specific Resources can be found at `uoft.me/freeresources`.

Additional Questions & Answers

> *If you want to know, you ask the question. There's no such thing as a dumb question. It's dumb if you don't ask it.* –Katherine Johnson

What should I do if I require an academic accommodation?

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the Universitys courses and programs.

If you have a learning need requiring an accommodation, immediately register at Accessibility Services at `http://www.accessibility.utoronto.ca/Home.htm`. You can also register online at `https://www.studentlife.utoronto.ca/as/new-registration`.

Can I record the lectures that I attend or share course materials?

Course materials are provided for the use of enrolled students only and that registered students are not allowed to post, share, or sell course materials without written permission of both the Instructor and the Course Coordinator.

If a student wishes to tape-record, photograph, video-record, take pictures of, or otherwise reproduce lecture presentations, course notes or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise all such reproduction is an infringement of copyright and is absolutely prohibited. In the case of private use by students with disabilities, the instructors consent will not be unreasonably withheld.

For more information on copyright and the University of Toronto, please visit the copyright page at `https://onesearch.library.utoronto.ca/copyright/copyright`.

What if I have a scheduling conflict with the Term Test, or I get sick?

Instructions will be posted on the course website prior to the Term Test; do not inquire before these are posted.

If I have a question about the course, who should I ask?

First, make sure that your question has not been answered in this syllabus, on the course website, or in class. You should start by asking your classmates to ensure that your question has not yet been answered. **Instructors and TAs will not answer questions about the content of the course ('math questions') via email**. If you have a math question for an instructor or TA, you should attend an office hour, or take advantage of other resources for learning on campus.

If you send an email about the course, you must use your U of T email address, as your instructors will not communicate information about the course to other addresses.

- Questions specific to your section should be sent to your instructor.
- Questions related to MAT135 as a whole (including tutorials and assessments) may be directed to admin135@math.toronto.edu. This address will be checked 2-3 times a week, and inquiries directed to it will be forwarded to the appropriate contact. Note that:
  - Inquiries about registration in lecture sections or tutorial sections cannot be answered by the MAT135 instructional team (registration is done centrally through the Registrar's Office).
  - Initial regrading requests for the midterm must be submitted through the process announced following the Term Test; appeals of regrading decisions may be sent to the administrative email.
  - We will not answer questions addressed in the Syllabus or on the course website.
- Teaching Assistants do not answer any inquiries via email.

You do *not* need to email your TA or instructor if you miss a tutorial or lecture.

Remember that you should always be respectful in your speaking and actions. When in doubt about how you should speak, write, or act, always err on the side of formality. You will never offend or annoy someone by being overly formal or polite. The University is a professional environment, and that when you send emails you must be professional. For example, you must be polite and use proper grammar and should begin an email with "Dear Professor _____" rather than "Hi".

> *This is not the end or the beginning of the end, but it is the end of the beginning.*
> –Winston Churchill