# MATH*1200

# Calculus I

# Fall 2020

UNIVERSITY *of* GUELPH

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# 1 INSTRUCTIONAL SUPPORT

## 1.1 Instructor

**Mihai Nica, Ph.D.**
Email:　　　math1200@uoguelph.ca
Office hours:　TBA. Office hours will be held online via Zoom.

Due to large class size, office hours are held in a group setting. In previous years, this to be a very productive and supportive learning environment in the past. Should you require an individual, private appointment, please contact me by email to set up a meeting.

## 1.2 Teaching Assistants

| | |
|---|---|
| John Dewhurst | dewhursj@uoguelph.ca |
| Roie Fields | rfields@uoguelph.ca |
| Connor Gregor | cgregor@uoguelph.ca |
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| Daiana Spataru | dspataru@uoguelph.ca |
| Hamdah Tahir | hamdah@uoguelph.ca |
| Lucy Tran | ltran07@uoguelph.ca |

# 2 LEARNING RESOURCES

## 2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the MATH*1200 Courselink website. ***You are responsible for keeping up-to-date on this site.***

## 2.2 Required Resources

M. Demers and K. Levere, *MATH*1200 – Calculus I Course Manual (7th Edition)*, available at the MacNaughton Bookstore.

- This is the primary resource for this course and functions both as a textbook, and as a notebook that we will complete together in class as the course progresses. Please be sure that you have the current version, the 7th edition (only available at the MacNaughton Bookstore.)

## 2.3 Additional Resources

Past tests, supplementary questions, and other resources may be posted on the Courselink course website as needed. Again, it is important that you check regularly to keep up-to-date.

**Lecture Information**:

Lectures will be held synchronously online and use the classroom response software TopHat to facilitate classroom participation in real time during lectures. There is a discounted price for using this software which we have negotiated with TopHat; see the course website for details on how to get setup. Actively engaging in the course material during lecture leads to higher retention and understanding. You will receive marks for lecture participation (see grading for a breakdown). Recordings of the lectures will be posted online afterwards.

**Lab Tutorial Information:**

During weeks where there is no test, a weekly lab session will give you the opportunity to tackle tougher problems or extra practice questions. I may also use this time to cover course material directly from the Course Manual.

**Piazza forums and Karma bonus points:**

We will be using the Piazza platform to help facilitate student questions during the term. You are highly encouraged to post questions to Piazza and to help answer other students questions on Piazza. Good questions on Piazza will not just state a problem, but will include what you have tried so far and clarification on what exactly it is you don't understand. Good answers on Piazza will not just provide the final answer but will explain *why* with a well justified solution.

The instructor and course TAs will identify good questions and good answers on Piazza during the term. You can earn up to 5 Karma bonus points during the term for your participation on Piazza by posting good questions and/or answers. Karma points increase your course grade by the following prescription: if you earned $n$ Karma points, then those points are yours and the regular grading scheme will apply to the remaining *(100 – n)* of your course grade. (Example: If

you earned 5 Karma points, and got 60% on the rest of the course, then your final grade is 5+(100-5)60% =62%)

## 2.4    Communication & Email Policy

Please use office hours and Piazza discussion forums as your main opportunity to ask questions about the course. Email is to be used for logistical purposes and math questions are not generally answered by email. Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

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# 3    ASSESSMENT

## 3.1    Dates and Distribution

Your grade will be determined using the more favorable of the two grading schemes below. (See below for a detailed description of each category)

| Grading Scheme 1 | Grading Scheme 2 |
|---|---|
| TopHat 5% | TopHat 0% |
| Miniquizzes 15% | Miniquizzes 15% |
| Term Tests (x5) 60% | Term Tests (x5) 65% |
| Final Exam 20% | Final Exam 20% |

**TopHat classroom response:**

You receive credit for all TopHat questions you participate in during lecture; in some questions you will get full credit for simply participating, and in other questions you will get partial credit for participating with full credit granted for also getting the correct answer.

To account for technical problems and other valid reasons you might miss a class, we will allow you to miss up to 25% of all TopHat questions and still get a perfect TopHat grade. The 25% of questions you score the lowest on will be dropped, and only your top 75% of questions will be counted towards your final grade.

**Miniquizzes and Term Tests (online via Mobius):**

Miniquizzes and term tests will be held using the Mobius platform (see link from course site). To help you to learn the Mobius system, there is a posted a syntax quiz that will help you to learn how to properly input your answers and navigate the system. I highly recommend that you attempt this quiz a few times so that you are comfortable with the system.

You are permitted to use your notes during miniquizzes and test tests. Using *any external websites* or *communicating with anyone* during these examinations is an academic offence that will be treated seriously. See information on academic integrity below.

**Miniquizzes (online):** There will be 1-2 miniquizzes posted each week for you to complete. The content of these quizzes will be material covered in the previous week of classes. You have unlimited attempted to do each miniquiz up until their assigned due date. Miniquizzes for each week will be due Thursday at midnight. Your grade for each miniquiz will be equal to the highest grade received from all attempts you have taken at the miniquiz within the allotted time. You do not need to submit your written work for miniquizzes. Please check the course site for information about the miniquiz due dates.

**Term Tests (online):** There will be 5 term tests throughout the term which will be scheduled during the 1 hour lab timeslot from 1:30pm – 2:30pm on Fridays in their respective weeks. You only get one attempt for each term test and must complete it during the scheduled time. After each term test, you will upload your written work for the test to be graded; *showing your work clearly will make up a large part of your term test grade.*

Of the 5 term tests, your lowest grade will be dropped and only your best 4 tests will count towards your final grade.

The dates of the term tests are:
- Term Test #1: Friday Sept 25, 2020, 1:30pm-2:30pm
- Term Test #2: Friday Oct 9, 2020, 1:30pm-2:30pm
- Term Test #3: Friday Oct 23, 2020, 1:30pm-2:30pm
- Term Test #4: Friday Nov 6, 2020, 1:30pm-2:30pm
- Term Test #5: Friday Nov 27, 2020, 1:30pm-2:30pm

**Final Exam (online):** The final exam will be the same format as the term tests, but will be held during the final exam block after classes end. The final exam is scheduled Wednesday Dec 16, 2020 from 11:30am – 1:30pm.

### 3.2  Course Policies

**COVID-19 and Illness:** Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website

https://news.uoguelph.ca/2019-novel-coronavirus-information/

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.

**Academic Consideration:** When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, ID number, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration:

https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

**Accommodation of Religious Obligations**: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor at the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

**Missed midterm tests**: Missed test and/or miniquizzes will receive a grade of 0%, unless they are missed due to any of the above reasons, in which case the weight of the missed test or miniquiz will be added to the final exam.  There will be no makeup tests or miniquizzes.

**Minimum Passing Grade – Rule of 48%:** In order to pass the course, you must receive a final grade of at least 50%. Additionally, in order to pass this course, you must receive at least 50% of the marks available, in total, on the term tests and final exam that are used to calculate your final grade. This rule means you cannot rely on grades from mini-quizzes and TopHat participation to improve your grade from below a 50% to a passing grade. If you do not achieve this, your maximum possible final grade will be 48%.

**Group Work:** While you are encouraged to work together to learn the course material and complete For You to Try exercises, all miniquizzes and term tests must be completed individually. It is academic misconduct to complete another student's quizzes. Please see section 6 of this outline for further details on academic misconduct.

**Copies of out-of-class assignments:** Keep paper and/or other reliable back-up copies of all out-of-class assignments (for instance, the work you did for the mini-quizzes). You may be asked to submit this work at any time.

# 4   AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

## 4.1   Calendar Description

This is a theoretical course intended primarily for students who expect to pursue further studies in mathematics and its applications. Topics include inequalities and absolute value; compound angle formulas for trigonometric functions; limits and continuity using rigorous definitions; the derivative and derivative formulas (including derivatives of trigonometric, exponential and logarithmic functions); Fermat's theorem; Rolle's theorem; the mean value theorem; applications

of the derivative; Riemann sums; the definite integral; the fundamental theorem of Calculus; applications of the definite integral; the mean value theorem for integrals.

**Credit Weight:** 0.5     **Department:** Mathematics & Statistics     **Campus:** Guelph

**Prerequisite**: 1 of 4U Calculus and Vectors, 4U Advanced Functions and Calculus or Grade 12 Calculus

## 4.2   Course Aims

This course is an introductory course in Calculus. The objective of the course is to give you a strong mathematical background that you will require as you progress through your degree. The main goals of the course are (1) to teach students the Calculus concepts listed in section 4.1 at a level that promotes a deep understanding and (2) to explain how such concepts are applicable in their various degrees by exploring real-world problems.

## 4.3   Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Evaluate, graph and know the properties of a variety of functions, including trigonometric, logarithmic, and exponential functions.

2. Establish a set of techniques for solving inequalities (perhaps involving absolute value).

3. Establish a set of techniques for treating a wide variety of limits including basic limits and indeterminate forms. Have an understanding of what a limit is calculating.

4. Prove limits using a delta-epsilon definition.

5. Understand what the derivative of a function is and how to calculate it using basic formulas, or the first-principles definition of the derivative.

6. Apply theoretical results in mathematical reasoning.

7. Calculate antiderivatives (definite and indefinite) of basic, through to complicated functions and compositions of functions.

8. Understand the Riemann sum and how it motivates the definite integral.

9. Calculate the area under a curve or between several curves.

10. Solve word problems by applying formulas and techniques learned in class.

11. Identify inadmissible solutions that arise mathematically but are not logical possibilities in a given problem.

12. Think critically about complicated mathematical problems. Question the potential subtleties of such problems and give a complete and correct answer.

## 4.4    Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

| Graduate Attribute | Learning Objectives | Assessment |
|---|---|---|
| 1. Knowledge Base for Engineering | 1-12 | Quizzes, Tests Exam, Labs |
| 2. Problem Analysis | 1-12 | Quizzes, Tests Exam, Labs |
| 3. Investigation | 1-12 | Quizzes, Tests Exam, Labs |
| 4. Design | - | - |
| 5. Use of Engineering Tools | - | - |
| 6. Communication | - | - |
| 7. Individual and Teamwork | 1-12 | Labs |
| 8. Professionalism | - | - |
| 9. Impact of Engineering on Society and the Environment | - | - |
| 10. Ethics and Equity | - | - |
| 11. Environment, Society, Business, & Project Management | - | - |
| 12. Life-Long Learning | - | - |

## 4.5    Instructor's Role and Responsibility to Students

As your instructor, I must:

1. Develop and deliver course material in a professional way that facilitates learning for a variety of students and learning styles;

2. Respond to you.  This includes, as time permits, questions in lectures, after classes, during office hours, through online forums, or through email (where I reserve the right to reply within a timeframe of 1-2 days).  You are more than welcome to contact me at any time through these means if you have questions or concerns about the course or the course material.

3. Evaluate you fairly, and fairly as compared to your peers, providing prompt feedback on your performance and justification for your grade.  I must provide academic consideration, where appropriate, as described in Section 3.

### 4.6 Students' Learning Responsibilities

As a member of this class, you are expected to:

1. Take advantage of the learning opportunities provided during lectures and in tutorials.

2. Treat others with respect and dignity whenever you address them.

3. Genuinely attempt all homework in a timely manner, including the online miniquizzes and the "For You to Try" component of the Course Manual, on your own time.

4. Seek help if you have tried the homework and are still having difficulty with the course content. This means contacting me (*not* just at the last minute!) and possibly considering other resources as I recommend them to you;

5. Notify me, as described in Section 3, in the case that there are missed tests or academic conflicts that are known in advance. If illness, work, or extra-curricular activities are causing you to struggle, you are advised to keep me up-to-date on your progress, so that I can be more helpful to you.

### 4.7 Online Behaviour

Inappropriate online behaviour will not be tolerated. Examples of inappropriate behavior include:

• Posting inflammatory messages about your instructor or fellow students

• Using obscene or offensive language online

• Copying or presenting someone else's work as your own

• Adapting information from the Internet without using proper citations or references

• Buying or selling term papers or assignments

• Posting or selling course materials to course notes websites

• Having someone else complete your quiz or completing a quiz for/with another student

• Making false claims about lost quiz answers or other assignment submissions

• Threatening or harassing a student or instructor online

• Discriminating against fellow students, instructors or TAs

• Using the course website to promote profit-driven products or services

• Attempting to compromise the security or functionality of the learning management system

• Sharing your user name and password

• Recording lectures without the permission of the instructor

# 5 TEACHING AND LEARNING ACTIVITIES

## 5.1 Timetable

**Lectures (Online):**

| | |
|---|---|
| Monday | 11:30-12:20 |
| Wednesday | 11:30-12:20 |
| Friday | 11:30-12:20 |

**Lab (Online):**

| | |
|---|---|
| Friday | 13:30-14:20 |

## 5.2 Lecture Schedule

(schedule is approximate and subject to change depending on time constraints)

| Lectures (Week) | Lecture Topics | References |
|---|---|---|
| Self-study | Review of Functions – basic functions, trigonometric functions, exponential and logarithmic functions. | Chapter 1 |
| 1 | Piecewise functions, the absolute value function, and inequalities. | Chapter 2 |
| 2 | Limits & Continuity | Chapter 3 |
| 3 | The Formal Definition of a Limit | Chapter 4 |
| 4 | Continuity Theorems | Chapter 5 |
| 5 | Derivatives | Chapter 6 |
| 6 | Implicit Derivatives & Applications | Chapter 7 |
| 7 | Derivative Theory | Chapter 8 |
| 8 | Applications of Differentiation | Chapter 9 |
| 9 | Antiderivatives | Chapter 10 |
| 10-11 | Riemann Sums and Definite Integrals | Chapter 11 |
| 12 | Applications of Integration | Chapter 12 |

## 5.3 Lab Schedule

Lab topics will correspond to weekly topics. Together we will practice the material covered in class as well as extend it to more interesting problems.

## 5.4 Other Important Dates

**First day of MATH1200 lecture:** Friday, September 11th, 2020.
**Fall Break:** Monday, October 12th to Tuesday, October 13th 2020. (no classes)
**Last day of classes:** Friday, December 4th, 2020.

**Drop Date:** Courses that are one semester long must be dropped by the last day of class (**Friday, December 4th, 2020**). The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

**Course Evaluation Information:** Near the end of the term, you will be given the opportunity to evaluate your instructor and provide comments regarding your experience. The evaluations for this class will be done in-class. Your instructor will inform you of when these are to take place.

# 6   ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it.

Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

## 6.1   Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:
http://www.academicintegrity.uoguelph.ca/

# 7  ACCESSIBILITY

The University promotes the full participation of students who experience disabilities in their academic programs.  To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS).  Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40$^{th}$ Class Day.

More information: [www.uoguelph.ca/sas](www.uoguelph.ca/sas)

# 8  RECORDING OF MATERIALS

Presentations which are made in relation of course work – including lectures – cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

# 9  RESOURCES

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

[http://www.uoguelph.ca/registrar/calendars/index.cfm?index](http://www.uoguelph.ca/registrar/calendars/index.cfm?index)