

**University of Guelph**  
**Department of Mathematics and Statistics**  
**MATH 1080 – Elements of Calculus I: Winter 2019**

**Course Information**

**Instructor:** Nagham Mohammad

**Lectures:** Monday, Wednesday and Friday 9:30am - 10:20am.

**Location:** RICH 2520

**Lab Schedule:** Friday 08:30 am – 9:20 am in ROZH103.

**TA Office Hours:** Will be posted on CourseLink.

**Instructor Information**

**Name:** Dr. Nagham Mohammad

**Office:** MACN 513.

**Office Hours:** Monday and Wednesday 10:30am - 11:30am.

**Email:** [naghamm@uoguelph.ca](mailto:naghamm@uoguelph.ca)

You can expect a response to emails within 24 hours Monday-Friday.

**Textbook/Course Materials**

Required textbook: Math 1080 Elements of Calculus Course Notes and Laboratory Manual, 8th. Edition.

Author: Joseph Cunsolo, Publisher: Pearson Custom Publishing, © 2015. **You are required to bring this manual to every lecture and lab session.**

**CourseLink:**

Course information and material (such as assignments, data sets, etc.) will be available on CourseLink. Students are responsible to check the website regularly for updated information and announcements.

**Course Description**

This course provides an introduction to the calculus of one variable with emphasis on mathematical modelling in the biological sciences. The topics covered include elementary functions, sequences and series, difference equations, differential calculus and integral calculus.

## **Learning Outcomes:**

By the end of this course, students should be able to:

- Graph a foundation set of single variable functions and their inverses, including complete knowledge of domains and ranges (using interval notation), including stretches/compressions/reflections in both axes, translations, and limited function compositions.
- Intuitively explain and contrast one-to-one and onto single variable functions and their inverses, including a discussion of inverse functions, restricted domains and ranges.
- Interpret biological models as single variable functions. This includes demonstration of knowledge of periodicity, determining parameters of least squares models, allometric and exponential functions, including demonstration of an introductory understanding of half-life, doubling, piecewise defined functions, discrete first order-linear-constant coefficient homogeneous and non-homogeneous difference equations, steady state, fixed points, limited series and Corresponding closed form solutions, and some integral equations.
- Intuitively explain and contrast one sided and two sided limits of single variable functions.
- Define a continuous single variable function (on an open interval).
- Define the derivative of a single variable function in terms of the limit of a difference quotient.
- Explain, compare and distinguish details between continuous and differentiable single variable functions.
- Explain, compare and distinguish details between average rate of change and instantaneous rate of change.
- Differentiate and implicitly differentiate single variable functions using the product rule, quotient rule and chain rules as needed.
- Take log transforms as needed in order to differentiate functions of the form  $f(x)^{g(x)}$
- Compute the equation of a line tangent to a function at a point for both implicit and explicit functions. Compute and make use of differentials with respect to approximations of single variable functions.
- Compute and make use of Taylor series approximations of single variable functions.
- Compute second derivatives of single variable functions.
- Explain and graph increasing and decreasing single variable functions, concave up and concave down single variable functions, and local and global extrema.
- Explain, compare and distinguish details between critical points, extrema, maxima, minima, possible points of inflection and points of inflection.
- Solve simple related rate and optimization problems.
- Define the indefinite integral in terms of anti-differentiation.
- Compute indefinite integrals of single variable functions.
- Compute the area under a single variable function, and the area bounded between two single variable functions as a Riemann sums.

- Recite the Fundamental Theorem of Calculus.
- Compute the area of a region bounded by more than two single variable functions with an ability to reverse the roles of  $x$  and  $y$  as needed for simplification.
- Explain, compare and distinguish details between computing the value of a definite integral versus computing the area under a single variable function.

### **Missed Lectures:**

If you miss lectures then you are responsible for finding out what you missed. Your instructor will not reteach missed material.

### **Out-of-Class Workload:**

As in any university course much of your learning in this course will take place outside of class time. Each week you have 3 hours of lectures. Therefore you should plan to spend 3-6 hours each week in out-of-class learning. This learning consists mostly of making sure you understand the concepts and steps that were used in class to solve problems and then solving problems from the practice problems on your own.

### **Grading Scheme:**

There are 2 grading schemes in order to minimize the impact of a poor performance on either of the 2 midterms. The scheme that gives you the best mark will be used automatically.

<b>Scheme 1</b>	<b>Scheme 2</b>
3 Lab Assignments: 15%	3 Lab Assignments: 15%
Midterm Test 1 – 20%	Best Midterm Test – 20%
Midterm Test 2 – 20%	Worst Midterm Test – 10%
Final Exam – 45%	Final Exam – 55%

### **Midterm Tests:**

There will be 2 Midterm Tests; venues and material to be covered will be announced closer to the Midterm date.

**Midterm Test 1: Wednesday February. 13<sup>th</sup>, 9:30 - 10:20 am.**

**Midterm Test 2: Wednesday March 20<sup>th</sup>, 9:30 - 10:20 am.**

**\*Note\* There are no alternate test dates nor make-up.**

### **Lab Assignments:**

There are 3 scheduled Lab Assignments to be completed during Lab time. See the course schedule below. The Lab Assignments will be open book and you may work with others. TAs will be present to help. If you miss any of these assignments for a **valid** reason, the weight from that assignment will be carried to the final exam.

**\*Note\* There are no alternate lab assignment dates nor make-up.**

### **Final Examination:**

A two hour final examination will be held on Tuesday April 16<sup>th</sup> at 11:30am. Please do not make any travel arrangements. Information regarding midterm tests, and final exam (e.g. material covered and locations) will be posted on the CourseLink. Students must present a valid Student ID card to write all tests and final exam.

### **Calculator Policy:**

Regarding both term tests and the final examination, calculators are NOT ALLOWED. Additional aids are not allowed e.g. notes, books, communication or scrap paper.

### **Remarking of Tests:**

If you have a question regarding the marking of a test you must first check the posted solutions. If you still have a question, then you should follow the procedure posted on the CourseLink. **You have 7 days to appeal a test grade.**

### **Missed Midterm Tests or Final Exam:**

The final exam (date, time and location) is scheduled by the Registrar's Office. Students who miss the final exam due to a valid, documented reason must contact their program counsellor for advice on University regulations regarding final exams.

**\*Note\*** If a midterm test is missed for a **valid** reason, the weight from that test will be carried to the final exam.

### **Learning Centre:**

Drop-in help is available in the Statistics Learning Centre (Science Commons, 3rd floor of the library) for students seeking help with course content and/or assignments. Hours of operation are Monday/Wednesday: 9:30am - 3:30pm, Tuesday/Thursday: 10am - 4pm, Friday: 9:30am - 2:30pm. Students are expected to use the Statistics Learning Centre as a primary resource for help with course material.

### **Drop Date:**

The last date to drop one-semester courses is Friday, March 8<sup>th</sup>, 2019. For regulations and procedures for Dropping Courses, see the Academic Calendar:  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

## **University Policies**

### **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#, and e-mail contact. See the academic calendar for information on regulations and procedures for academic consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

### **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 or faculty advisor. The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

### **Accessibility**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website:

<http://www.uoguelph.ca/csd/>

### **Course Evaluation Information**

Please see

<http://www.mathstat.uoguelph.ca/files/TeachevaluationformF10.pdf>

### MATH1080 Winter 2019 Course Schedule (Tentative)

The following table gives a tentative schedule for the material covered with modules in Course Notes indicated.

Week	Topics	Notes
1. Jan. 7-11	Introduction Module 1	Lab 1: No Part A. Lab 1: Complete Part B as independent study.
2. Jan. 14-18	Module 2 and Module 3	Lab 2: Part A. Lab 2: Complete Part B as independent study.
3. Jan. 21-25	Module 4	Lab 3: Part A. Lab 3: Complete Part B as independent study.
4. Jan. 28-Feb. 1	Module 5 and Module 6  Review for Midterm 1	<b>Lab Assignment 1</b>
5. Feb. 4-8	Module 7	Lab 4: Part A. Lab 4: Complete Part B as independent study.  Lab 5: No Part A Lab 5: Complete Part B as independent study.
6. Feb. 11-15	Module 8	<b>Midterm 1</b> <b>Wednesday Feb. 13</b>  Lab 6: Part A. Lab 6: Complete Part B as independent study.
Reading Week Feb18-22	Winter Break No Classes and No LABS	
7. Feb. 25-Mar 1	Module 9	Lab 7: Part A. Lab 7: Complete Part B as independent study.

8. Mar 4 -8	Module10	Lab 8: Part A. Lab 8: Complete Part B as independent study.
9. Mar. 11-15	Module 11 and 12 Review for Midterm 2	<b>Lab Assignment 2</b> Lab 9: NO Part A. Lab 9: Complete Part B as independent study.
10. Mar. 18-22	Module 13	<b>Midterm 2</b> <b>Wednesday March 20<sup>th</sup></b> <b>9:30-10:20am</b>  Lab 10: NO Part A. Lab 10: Complete Part B as independent study.  Lab 11: Part A. Lab 11: Complete Part B as independent study.
11. Mar. 25-29	Module 14	<b>Lab Assignment 3</b>
12. April 1 -5	Module 15 Review for the Final Exam	Lab 12: Part A. Lab 12: Complete Part B as independent study.