



## Departments of Mathematics and Applied Mathematics Calculus 1000A – Calculus I

### Fall 2020 Course Outline



Although this academic year might be different, Western University is committed to a **thriving campus**. We encourage you to check out the [Digital Student Experience](#) website to manage your academics and well-being. Additionally, the following link provides available resources to support students on and off campus: <https://www.uwo.ca/health/>.

### Technical Requirements for the Course

Calculus 1000A takes place entirely online and therefore it is essential that each student has access to the technology that will be used to deliver the course, including:

- Laptop or computer
- Stable internet connection
- Working microphone
- Working webcam
- Device for scanning (either a scanner or an app that can be used in conjunction with your device's camera).

### Course Overview and Important Dates

| Classes Start | Reading Week   | Classes End | Study day(s) | Exam Period      |
|---------------|----------------|-------------|--------------|------------------|
| September 9   | November 2 - 8 | December 9  | December 10  | December 11 - 22 |

\* November 12, 2020: Last day to drop a first-term half course or a first-term full course without penalty

| Section                      | Dates            | Time            |
|------------------------------|------------------|-----------------|
| Lecture (LEC 001)<br>ONLINE  | Asynchronous     | N/A             |
| Tutorial (TUT 002)<br>ONLINE | Monday/Wednesday | 8:30am – 9:30am |
| Tutorial (TUT 003)<br>ONLINE | Monday/Wednesday | 8:30am – 9:30am |
| Tutorial (TUT 004)           | Tuesday/Thursday | 8:30am – 9:30am |

|                              |                  |                   |
|------------------------------|------------------|-------------------|
| ONLINE                       |                  |                   |
| Tutorial (TUT 005)<br>ONLINE | Tuesday/Thursday | 8:30am – 9:30am   |
| Tutorial (TUT 006)<br>ONLINE | Wednesday/Friday | 8:30am – 9:30am   |
| Tutorial (TUT 007)<br>ONLINE | Wednesday/Friday | 8:30am – 9:30am   |
| Tutorial (TUT 008)<br>ONLINE | Monday/Wednesday | 9:30am – 10:30am  |
| Tutorial (TUT 009)<br>ONLINE | Tuesday/Thursday | 9:30am – 10:30am  |
| Tutorial (TUT 010)<br>ONLINE | Tuesday/Friday   | 11:30am – 12:30pm |
| Tutorial (TUT 011)<br>ONLINE | Tuesday/Friday   | 11:30am – 12:30pm |
| Tutorial (TUT 012)<br>ONLINE | Tuesday/Friday   | 12:30pm – 1:30pm  |
| Tutorial (TUT 013)<br>ONLINE | Tuesday/Friday   | 12:30pm – 1:30pm  |
| Tutorial (TUT 014)<br>ONLINE | Monday/Thursday  | 1:30pm – 2:30pm   |
| Tutorial (TUT 015)<br>ONLINE | Monday/Thursday  | 1:30pm – 2:30pm   |
| Tutorial (TUT 016)<br>ONLINE | Monday/Thursday  | 1:30pm – 2:30pm   |
| Tutorial (TUT 017)<br>ONLINE | Monday/Thursday  | 1:30pm – 2:30pm   |
| Tutorial (TUT 018)<br>ONLINE | Monday           | 7:00pm – 9:00pm   |
| Tutorial (TUT 019)<br>ONLINE | Tuesday          | 7:00pm – 9:00pm   |
| Tutorial (TUT 020)<br>ONLINE | Wednesday        | 7:00pm – 9:00pm   |
| Tutorial (TUT 021)<br>ONLINE | Thursday         | 7:00pm – 9:00pm   |

\*Please note that the above times are given in Eastern Time (currently EDT, or GMT -4 hours.) That is, these times and all times mentioned in this outline are local for London, Ontario.

## Contact Information

| Course Coordinator | Email Address |
|--------------------|---------------|
| James Uren         | juren2@uwo.ca |

| Instructor             | TUT Sections | Email Address   |
|------------------------|--------------|-----------------|
| Eunice Chan            | 013, 015     | echan295@uwo.ca |
| Brandon Doherty        | 006, 016     | bdoher@uwo.ca   |
| Asghar Ghorbanpour     | 014, 021     | aghorba@uwo.ca  |
| Uzair Hussain          | 012, 017     | uhussai7@uwo.ca |
| Natalia Kiriushcheva   | 003, 010     | nkiriush@uwo.ca |
| Mohsen Mollahajiaghaei | 018, 019     | mmollaha@uwo.ca |
| Allen O'Hara           | 007, 020     | aohara@uwo.ca   |
| Tyler Pattenden        | 008, 011     | tpattend@uwo.ca |
| Martin Pinsonnault     | 005, 009     | mpinson@uwo.ca  |
| Gord Sinnamon          | 002, 004     | sinnamon@uwo.ca |

## Course Description

Review of limits and derivatives of exponential, logarithmic, and rational functions. Trigonometric functions and their inverses. The derivatives of the trig functions and their inverses. L'Hospital's rules. The definite integral. Fundamental Theorem of Calculus. Simple substitution. Applications of integration, including areas of regions and volumes of solids of revolution.

*Prerequisites:* Ontario Secondary School MCV4U or Mathematics 0110A/B

*Antirequisites:* Calculus 1500A/B, the former Calculus 1100A/B, Applied Mathematics 1413.

**All course material will be posted to OWL:** <http://owl.uwo.ca>. Any changes will be indicated on the OWL site and discussed with the class.

If students need assistance, they can seek support on the [OWL Help page](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be contacted by phone at 519-661-3800 or ext. 83800.

[Google Chrome](#) or [Mozilla Firefox](#) are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click [here](#).

## Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Compute the limits of functions at a point or at infinity using methods of algebra, limit laws, and related concepts.
2. Define the notion of continuous function and be able to determine if a given function is continuous using limits or other theorems.
3. Explain the role of limits in the definition of derivatives and integrals, and how the ideas of continuity, differentiability, and integrability are related to one another.
4. Compute derivatives and integrals of various algebraic, trigonometric, exponential, and logarithmic functions.
5. Deduce properties of the graph of a function from its derivatives and apply these concepts to solve optimization problems.
6. Apply the idea of the definite integral to compute areas between curves.

## Text and Resources

### Required Text:

*Calculus: Volume 1*, by Gilbert Strang and Edwin "Jed" Herman (OpenStax, 2016) – Access for free at <https://openstax.org/books/calculus-volume-1/pages/1-introduction>

### Optional Additions:

*Single Variable Calculus: Early Transcendentals (8<sup>th</sup> edition)*, by James Stewart (Cengage/Brooks Cole) – This is the text used for the most recent prior versions of Calculus 1000A. While it is not required that you have access to this text, some students may benefit from an additional resource. The text is currently in its 9<sup>th</sup> edition.

*Calculus... Fear No More*, by Miroslav Lovric (Nelson)

Lecture Notes for Calculus Volume 1, by R.N. Bryan (Custom Course Materials)

Midterm Tests and Final Exams for Calculus 1000A/B, by R.N. Bryan (Custom Course Materials)

## Course Content Schedule

| Week | Dates           | Topic  | Text Reference Sections |
|------|-----------------|--|-------------------------|
| 1    | Sept 9 – 13     | Introduction and Review  | 1.1, 1.2                |
| 2    | Sept 14 – 20    | Exponential, Trigonometric, and Inverse functions                                      | 1.3, 1.4, 1.5           |
| 3    | Sept 21 – 27    | Limits and Continuity  | 2.2, 2.3, 2.4           |
| 4    | Sept 28 – Oct 4 | Limits at infinity/The Derivative  | 4.6, 3.1, 3.2           |
| 5    | Oct 5 – 11      | Derivative as a Function/Differentiation Rules   | 3.2, 3.3, 3.5, 3.7      |
| 6    | Oct 12 – 18     | The Chain Rule/Implicit Differentiation  | 3.6, 3.8                |
| 7    | Oct 19 – 25     | Derivatives of Logarithmic Functions/Related Rates                                     | 3.9, 4.1                |
| 8    | Oct 26 – Nov 1  | Maximum and Minimum Values/Relationship Between Derivatives and the Shape of the Graph | 4.3, 4.5                |
| 9    | Nov 2 – 8       | Reading Week   | N/A                     |
| 10   | Nov 9 – 15      | Optimization Problems/L'Hospital's Rules and Indeterminate Forms                       | 4.7, 4.8                |
| 11   | Nov 16 – 22     | Antiderivatives/Sigma Notation   | 4.10, 5.1               |
| 12   | Nov 23 – 29     | The Definite Integral/Fundamental Theorem of Calculus                                  | 5.2, 5.3                |
| 13   | Nov 30 – Dec 6  | Simple Substitution/Areas Between Curves   | 5.4, 5.5, 5.6, 6.1      |
| 14   | Dec 7 – 9       | Volumes/Review   | 6.2                     |

\*\*The above schedule is *tentative*, and minor adjustments may be made as the course progresses. Additionally, weekly lessons (including video lecture content and supplemental notes provided by your instructors) and suggested exercises corresponding to the various sections of our required text are posted on the OWL site for the course.

## Evaluation

Below is the summary of graded assessments in Calculus 1000A. Any deviations from this schedule will be communicated and the schedule should be considered tentative until confirmed.

| Assessment         | Format               | Weighting  | Date                             |
|--------------------|----------------------|--|----------------------------------|
| Submitted Homework | Online, asynchronous | Equally weighted assessments totaling 10% of final grade | Weekly (varies)                  |
| Quizzes            | Online, synchronous  | Equally weighted assessments totaling 10% of final grade | Weekly (varies)                  |
| Test 1             | Online, synchronous  | 20%  | Friday, October 16 <sup>th</sup> |

|            |                     |     |                                   |
|------------|---------------------|-----|-----------------------------------|
| Test 2     | Online, synchronous | 20% | Friday, November 13 <sup>th</sup> |
| Final Exam | Online, synchronous | 40% | TBA                               |

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

|    |          |   |
|----|----------|---|
| A+ | 90-100   | One could scarcely expect better from a student at this level   |
| A  | 80-89    | Superior work which is clearly above average                    |
| B  | 70-79    | Good work, meeting all requirements, and eminently satisfactory |
| C  | 60-69    | Competent work, meeting requirements                            |
| D  | 50-59    | Fair work, minimally acceptable                                 |
| F  | below 50 | Fail  |

#### Other Information About Tests and Examinations:

- Virtual proctoring will be employed on test 1, test 2, and the final exam.
- Test 1 and test 2 will be 120 minutes in duration and will consist of a mixture of short answer and multiple-choice-style questions. *These will be closed book tests.*
- The final exam will be 180 minutes in duration and will consist of a mixture of short answer and multiple-choice-style questions. *This will be a closed book exam.*
- For multiple choice components of tests and the exam: use may be made of software to check for unusual coincidences in answer patterns that may indicate academic integrity violations.
- The use of calculators and communication devices during the tests and final exam is prohibited.
- Missing a quiz, test, the final exam, or the due date of a submitted homework assessment will result in a grade of zero unless appropriate permission is sought and granted. In that case, your mark may be re-weighted, or a makeup evaluation may be arranged.

## Course Design and Expectations

Calculus 1000A is an online course with asynchronous delivery of lecture material and course content. Students are expected to attend lectures by completing various activities (reading prescribed sections of the text or completing video lessons, for example), although you are permitted to schedule these activities during a given week in a way that is personally optimal. A list of suggested exercises from the text will be provided to supplement the weekly lessons. The evaluations (quizzes, tests, and exam) for Calculus 1000A are based on the course material distributed in this manner.

Additionally, your instructor will host a synchronous tutorial session each week to review and expand on the lesson(s) from the previous week. These may take the form of a problem session or a discussion, depending on the week, but will always be scheduled to conclude within your allotted tutorial time. Attendance will not be taken but is very strongly encouraged.

| Activity       | Mode                | Section                           |
|----------------|---------------------|-----------------------------------|
| Weekly Lessons | Online asynchronous | LEC 001 (approximately 4hrs/week) |

|                                |                           |  |
|--------------------------------|---------------------------|--|
| Tutorial Review and Discussion | Online synchronous (Zoom) | By tutorial, TUT 002 – TUT 021 (up to 2hrs/week) |
|--------------------------------|---------------------------|--|

## Communication and Participation

- Students are responsible for monitoring the OWL site(s) for the course and should aim to check for updates every day or two.
- Important updates and announcements will be provided via OWL.
- The course staff will monitor email regularly and reply as promptly as possible, and all students are required to do the same.
- Students are strongly encouraged to post questions about the lessons or homework on the site forum.
- Each week you should endeavor to fully complete the lessons of the previous week so that you are well prepared for your tutorials.
- Your instructors will provide office hours each week, scheduled at a time complementary to the tutorial, for individual or small group consultation.
- If you have questions about the course or material, please don't leave them too long. When in doubt, contact the course coordinator.

### Other Helpful Suggestions:

- Success in undergraduate mathematics requires some self-direction and independence. In addition to routine practice, students should set aside time each week to try and generate and review their own questions about the course material.
- Try and take notes of your own or work out examples (as though you were in an in-person lecture) when you complete the weekly lessons. Try to be as active as possible when reading or viewing course content.
- Always remember to ask questions frequently. If you are struggling with the material, contact your instructor (or teaching assistant(s)).

## Professionalism and Privacy

Western students are expected to follow the [Student Code of Conduct](#). Additionally, the following expectations and professional conduct apply to this course:

- Students are expected to follow online etiquette expectations provided on OWL.
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared.
- Recordings are not permitted (audio or video) without explicit permission.
- Permitted recordings are not to be distributed.
- Students will be expected to take an academic integrity pledge before some assessments.
- All recorded sessions will remain within the course site.

## Western Academic Policies and Statements

### Absence from Course Commitments

[Policy on Academic Consideration for Student Absences](#)

In the interest of the health and safety of students and health care providers, you are no longer required to seek a medical note for absences this term. If you are unable to meet a course requirement due to illness you should use the [Illness Reporting Tool](#). This tool takes the place of the need to submit a medical note and the Self-Reported Absence System formally used by undergraduate students.

### **Remote Proctoring Statement**

Tests and examinations in this course will be conducted using the remote proctoring service Proctortrack. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. More information about this remote proctoring service is available in the Online Proctoring Guidelines at the following link:

<https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. Information about the technical requirements are available at the following link:

<https://www.proctortrack.com/tech-requirements/>

### **Accommodation for Religious Holidays**

The policy on Accommodation for Religious Holidays can be viewed [here](#).

### **Special Examinations**

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found [here](#).

### **Academic Offenses**

“Scholastic offences are taken seriously, and students are directed [here](#) to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

### **Accessibility Statement**

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation or review [The policy on Accommodation for Students with Disabilities](#).

### **Correspondence Statement**

The centrally administered **e-mail account** provided to students will be considered the individual’s official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts [here](#).

## Other Academic Policies and Statements

### Copyright and Audio/Video Recording Statement

**All of the remote learning sessions for this course will be recorded.** The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

### Course Requisites Statement

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

## Support Services

The following links provide information about support services at Western University:

[Academic Counselling \(Science and Basic Medical Sciences\)](#)

[Appeal Procedures](#)

[Registrarial Services](#)

[Student Development Services](#)

[Student Health Services](#)