

MATH 100A: Calculus I

3 Credits, 3 hours lecture, 2 hour lab

4.0 Engineering units for the University of Alberta

This course covers rectangular and polar coordinates, analytic geometry, transcendental functions, limits, continuity, derivatives and applications, Taylor polynomials, integration and applications.

Prerequisites: MATH 30-1 and MATH 31 (or equivalent)

NOTE: This course may not be taken for credit if credit has already been obtained in MATH 1113, or University of Alberta's MATH 114 or MATH 117. MATH 100 is restricted to Engineering students.

Instructor

Instructor Name: Matthew Morin

Office location: S211E

Phone number: 780-791-4831

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Office Hours

Monday 13:00 – 15:00

Wednesday 13:00 – 15:00

Friday 11:00 – 12:00

Hours of Instruction

Tuesday 10:30 – 11:50 (Room S216)

Thursday 10:30 – 11:50 (Room S216)

Friday 13:00 – 14:50 (Room S205)

Required Resources

Subscription to WebAssign (<http://webassign.net/>) is required for the completion of the online homework. An e-version of the textbook (**Calculus: Early Transcendentals**, 9th edition, by Stewart, Clegg, and Watson) is viewable through the WebAssign system. WebAssign access can be purchased directly through their website (details in class) or access can come packaged bundled with a physical textbook (Warning: an incorrect edition might not come with the correct access code.)

Course Outcomes

Upon successful completion of this course, the student shall be able to:

- Setup and evaluate limit problems
- Apply the derivative rules to differentiate complex combinations of these functions.
- Apply derivatives to solve problems involving rates of change.
- Given a formula for a function, determine the intervals where it is
 - Increasing or decreasing

- Concave upward or concave downward and determine the function's
- Maximum and minimum values
- Points of inflection.
- Create a reasonable sketch of the function given information about its derivatives.
- Apply knowledge of derivatives to find the optimal solution to a variety of word problems.
- Explain the difference between the definite and indefinite integral.
- Use integrals to solve area problems, initial value problems, and net-change problems.
- Recognize and employ the substitution method to evaluate more complex integrals.
- Demonstrate an ability to communicate a solution using the language and theory of calculus.

Evaluation

Assignments	8% (2.5% Webassign, 2.5% Homework Sets, 3% In-Class Work)
Midterm Exam 1	21%
Midterm Exam 2	21%
Final Exam	50%
Total	100%

A grade of C- is required for progression or transfer.

Assignments:

In any mathematics course the best way “to learn” is “to do.” The instructor can teach you about the course ideas and demonstrate the mechanics of solving the problems—and can make it look very easy—but growing adept at solving these problems will take a lot of practice and can be a struggle. Although the assignments do not count for a large part of your final grade they are essential in preparing you for the types of problems you will be solving on the exams.

Assignment completion is a requirement of the course. Failure to complete all the assignments may result in a failing grade for the course.

The “Homework Sets” are sets of problems you will solve at home then hand in your solutions in-class. (As opposed to the online “Webassign” assignments and “In-Lab” assignments.) A cover page is not required, but the assignment number, the course number, and your name should be clearly written on the front page. Homework problems should be presented in the order that they were listed. If more than one page is needed, then the pages should be stapled together (in the proper order). A late assignment may be accepted, or may incur a penalty depending on the circumstances. Once marked assignments are returned to the class, no further late assignments can be submitted.

In addition to the submitted paper copy, **a digital version of each homework set must also be uploaded to our course's Moodle page.** If your solutions are handwritten, you may scan your work at one of the college photocopiers (such as the Library, the Skill Center, or the Info Commons), have the copier email the scan(s) to your Keyano email account, and then upload to our Moodle page.

Although you are permitted to work with other students while completing assignments, it is essential that the work you present is your own—see the section on Academic Misconduct later in this outline for more information. Presenting other students' solutions as your own may result in serious academic penalties. If you are working together with other students on a problem, it is vital that at the end of the process YOU know how to solve the problem and that YOU write out your own solution in your own way. If there is suspicion of academic misconduct, you will be required to defend the work you have submitted.

It is recommended that you attempt the assignments yourself before talking over problems with your classmates. If you need help with a problem you can come to office hours, visit the Skill Center, and (yes) talk to your classmates. However, this does not mean looking through a classmate's solution. Rather, it is best if you talk about the problem. If you do not understand what the problem is asking for, then it could be useful to read through the relevant sections of the textbook and the course notes.

Note: Before any written course work will be accepted, there are two conditions are meant to be fulfilled:

1. Successful completion of the online plagiarism course found at ilearn.keyano.ca.
2. A self-check of skills through the Pre-Calculus Diagnostic test which will be written early in the semester.

Tests:

All tests will be written and are closed-book. No calculators are allowed, nor should they be needed. The dates of most tests will be announced in-class and on Moodle well in advance of the test date. The details of the topics covered by tests will be given and a sample test will usually be provided. These tests are meant to test how well you have "mastered" the subject matter. Satisfactory completion of the relevant assignment problems, reading the relevant textbook sections, and studying the course notes is the very minimum amount of work that should prepare you for the types of problems that could appear on a test. However, as the larger tests are cumulative in nature, you may be solving problems that require ideas that bridge across several sections of the course.

Apart from the announced tests, there may also be several Pop Quizzes during the term. These will occur at the very start of a class with no prior warning, so it is important to arrive to each class on time. (If you cannot attend a class, it is important that you contact your instructor as soon as possible to notify them and give a brief explanation why.) These quizzes will be very short and **may test any topic that has been covered earlier in the semester**. Therefore, it is important that you periodically review topics from earlier in the term throughout the semester. If there are any of these Pop Quizzes, they will make up a small amount of the Assignment scores (as they are an in-class bit of work).

Grading System

Descriptor	Alpha Grade	4.0 Scale	Percent	Rubric for Letter Grades
Excellent	A+	4.0	> 92.9	Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format.
	A	4.0	85 – 92.9	
	A-	3.7	80 – 84.9	
Good	B+	3.3	77 – 79.9	Work is generally of high quality, well developed, well written, has clarity, and uses proper format.
	B	3.0	74 – 76.9	
	B-	2.7	70 – 73.9	
Satisfactory Progression	C+	2.3	67 – 69.9	Work has some developed ideas but needs more attention to clarity, style and formatting.
	C	2.0	64 – 66.9	
	C-	1.7	60 – 63.9	
Poor Minimum Pass	D+	1.3	55 – 59.9	Work is completed in a general way with minimal support, or is poorly written or did not use proper format.
	D	1.0	50 – 54.9	
Failure	F	0.0	< 50	Responses fail to demonstrate appropriate understanding or are fundamentally incomplete.

Proposed Schedule of Topics

Week	Dates	Topic	Chapter Sections
1	Aug. 30 - Sept. 3 (Classes begin Aug. 31)	Intro to Limits, Limit Laws	2.2, 2.3
2	Sept. 6 - Sept. 10 (No classes: Sept. 6)	Continuity, Calculating Limits	2.5, 2.3 (cont.)
3	Sept. 13 - Sept. 17	Limits at Infinity, Limit Definition of the Derivative	2.6, 2.7
4	Sept. 20 – Sept. 24	The Derivative as a Function, Derivative Rules of Basic Functions, Product and Quotient Rule	2.8, 3.1, 3.3, 3.6
5	Sept. 27 - Oct. 1	Product and Quotient Rule, Chain Rule, Implicit Differentiation Midterm 1 (Friday, Oct. 1)	3.2, 3.4, 3.5
6	Oct. 4 - Oct.8	Derivatives of Inverse Trig. Function, Logarithmic Differentiation, Hyperbolic Functions	3.5 (cont.) 3.6, 3.11
7	Oct. 11 - Oct. 15 (No Classes: Oct. 11)	Rates of Change, Related Rates	3.7, 3.9
8	Oct. 18 – Oct. 22	L'Hopital's Rule, Antiderivatives, Areas, Definite Integral	4.4, 4.9, 5.1
9	Oct. 25 – Oct. 29	Definite Integrals, Fundamental Theorem of Calculus, Indefinite Integrals	5.2, 5.3, 5.4
10	Nov. 1 – Nov. 5	Substitution, Mean Value Theorem Midterm 2 (Friday, Nov. 5)	5.5, 4.2
11	Nov. 8 – Nov. 12 (No Classes: Nov. 10, 11, 12)	Min and Max Values, How Derivatives Affect the Shape of a Curve	4.1
12	Nov. 15 – Nov. 19	How Derivatives Affect the Shape of the Curve, Curve Sketching	4.3, 4.5
13	Nov. 22 – Nov. 26	Optimization	4.5 (cont.), 4.7
14	Nov. 29 – Dec. 3 (No classes: Dec. 3)	Newton's Method, Linear Approximation	4.8, 3.10
	Dec. 8 – Dec. 16	Exam Period	

Please Note:

Date and time allotted to each topic is subject to change.

Performance Requirements and Student Services**Student Responsibilities**

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the

administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own;
- The use of unauthorized aids in assignments or examinations (cheating);
- Collusion or the unauthorized collaboration with others in preparing work;
- The deliberate misrepresentation of qualifications;
- The willful distortion of results or data;
- Substitution in an examination by another person;
- Handing in the same unchanged work as submitted for another assignment; and
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work may not be graded until you show this signed certificate.

Specialized Supports

The Student Services Department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented through a model to respond to the restrictions in force at the time. In-person and virtual services will be offered. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30. The College is closed for statutory holidays. If you require support outside of regular business hours, please inform the support service team, and we will do our best to accommodate your needs.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact us to request them for the semester. Please note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility supports and to book an appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. Schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing accessibility.services@keyano.ca

Wellness Services: offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. Students may access services virtually and in-person.

Wellness Services welcomes students to participate in any of the group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both online and in-person throughout the semester. For a detailed list of library supports and services, go to www.keyano.ca/library. For all inquiries, please email askthelibrary@keyano.ca or chat with us online.

Begin your research with the [Library's FIND page](#). Search for information and sources for your assignments using the OneSearch, the Library's Catalogue, or by searching in a specific database selected from the [A-Z Database List](#).

Individual support with us is available. For support with citations, research and other information needs, appointments can be booked using the online [Book A Librarian Calendar](#). For support with Moodle, educational tools for assignments, Microsoft Office, Zoom, Teams and more, book an appointment using the online [Educational Technology Support Calendar](#).

Research and subject guides are helpful resources when beginning your research, assignment, using new educational technology, or addressing other information needs. To view a subject or course-specific guide, check out the complete listing of online [Subject Guides](#).

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the [Research Help Library page](#).

The Loanable Technology collection is available to support students in their learning pursuits, whether online, in person or both. Items available for borrowing include mobile projectors, webcams, noise-cancelling headphones, Chromebooks, and laptops. For an up-to-date list of technology available for borrowing as well as support available, go to the Library's [Loanable Technology webpage](#).

Academic Success Centre: The Academic Success Centre is a learning space in the Clearwater Campus (CC-119) at Keyano College. Students can gather to share ideas, collaborate on projects, get new perspectives on learning from our Academic Content Specialists, or use the Centre's educational resources. The Academic Success Centre provides academic support services to students registered in credit programs at Keyano College in the form of individual tutoring, writing support groups, facilitated study groups, workshops, and study space. Services are **free** to Keyano students.

Academic Content Specialists are available in the areas of Math, Science, Human Services, and English/Humanities. This covers all courses offered at Keyano. The Academic Success Coach can also be found in the Academic Success Centre.

For the most up to date information on how to book a session, please view [the Keyano Academic Success Centre homepage](#).

Academic Integrity: The goal of the Academic Success Centre is to foster a student's ability to learn effectively and independently. Students registered at Keyano College are welcome to drop by the Centre to visit with any of our Academic Content Specialists to discuss their academic concerns.

Availability: Monday to Friday: 8:30 a.m. – 4:30 p.m. Flexible times may be available upon request. Virtual and in-person sessions, please email to get in contact with our Academic Content Specialists. For the most up to date information on how to book a session, please view the [Academic Success Centre homepage](#).

Academic Success Coach: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano. Academic.success@keyano.ca is the best way to access resources during blended service delivery. The Academic Success Coach is located in the Skill Centre in CC-119 at the Clearwater Campus.

E-Learning

Technology and internet will impact your online learning experience. It's important that you can watch an online video and other course materials, take online quizzes and participate in a live class with your instructor and other students. Live/virtual classes will be hosted in Microsoft Teams or Zoom.

For all course delivery types, you will access your course resources on Keyano's learning management system, **Moodle (iLearn)**. Login in using your Keyano username and password.

Keyano College operates in a Windows based environment, and having the correct tools for online learning is important. Here's a list of recommended system requirements.

Internet Speed

Minimum Internet speeds of 10 Mbps.

Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home).

Check your internet speed with Fast.com.

System requirements:

Microsoft Windows	Apple
<p>Minimum Requirements:</p> <ul style="list-style-type: none"> • A Windows 10 computer/laptop • Minimum 4GB of RAM. • 10GB+ available hard drive storage. • Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office software is free to all Keyano students and employees.</u> • Microphone, webcam and speakers. A headset with a microphone is recommended. • System updates must be regularly installed. • Anti-Virus / Anti-Malware software 	<p>Minimum Requirements:</p> <ul style="list-style-type: none"> • A Macintosh (V10.14 and above) computer/laptop • Minimum 4GB of RAM. • 10GB+ available hard drive storage. • Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office software is free to all Keyano students and employees.</u> • Microphone, webcam and speakers. A headset with a microphone is recommended. • System updates must be regularly installed. • Anti-Virus / Anti-Malware software.

<p>Recommended Requirements</p> <ul style="list-style-type: none"> 8GB of RAM A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. 	<p>Recommended Requirements</p> <ul style="list-style-type: none"> 8GB of RAM A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free.
<p>Chromebooks are not recommended as they are not compatible with testing lockdown browsers.</p> <p>A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.</p>	

Specific Department Requirements:

Business and OA programs require Windows 10.
Other programs may utilize Windows based tools as well.

Computer Software

Students will be able to get access to Microsoft Office 365 for free using Keyano credentials by [clicking here](#).

Recording of Lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or by Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not share, distribute, or publish any of the lectures or course materials, this includes any recordings, slides, instructor notes, etc. on any platform. Thus no student is allowed to share, distribute, publish or sell course related content (instructor, or students) without permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property. The [Academic Integrity Policy](#) provides additional information on Keyano College's expectations from students as members of the intellectual community.

ITS Helpdesk

If you are having issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.