

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

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Office Hours

Monday	14:00 – 15:00
Tuesday	14:00 – 15:00
Wednesday	14:00 – 15:00
Thursday	10:00 – 11:00
Friday	14:00 – 15:00

Hours of Instruction

Monday	11:00 – 11:50 (S214)
Tuesday	11:30 – 13:20 (S105)
Wednesday	11:00 – 11:50 (S214)
Friday	11:00 – 11:50 (S214)

Required Resources

Calculus, Early Transcendentals, James Stewart, 8th edition.

Subscription to WebAssign (<http://webassign.net/>) is required for the completion of the online homework. At the Keyano bookstore the above textbook comes packaged with a paid subscription.

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	12% (3% Webassign, 4% Homework Sets, 5% In-Lab Assignments)
Quizzes	18% (12% Announced Quizzes, 6% Pop Quizzes)
Midterm Exam	25%
Final Exam	45%
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 that need to be met:

1. Successful completion of the online plagiarism course found at ilearn.keyano.ca.
2. Successful completion of the Pre-Calculus Diagnostic test which will be written during the first class or, if the test result is unsuccessful, proven remediation on all questions that were answered incorrectly.

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 will 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.

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	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.
Minimum Pass	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	Sept. 3 - Sept. 7 (No classes Sept. 3,4)	Diagnostic Test, Course Introduction	
2	Sept. 10 - Sept. 14	Intro to Limits, Limit Laws, Continuity	2.2, 2.3, 2.5
3	Sept. 17 - Sept. 21	Calculating Limits, Limits at Infinity	2.3 (cont.), 2.6
4	Sept. 24 - Sept. 28	Limit Definition of the Derivative, The Derivative as a Function, Derivative Rules of Basic Functions	2.7, 2.8, 3.1, 3.3, 3.6
5	Oct. 1 - Oct. 5	Product and Quotient Rule, Chain Rule, Implicit Differentiation	3.2, 3.4, 3.5
6	Oct. 8 - Oct. 12 (No classes Oct. 8 th)	Logarithmic Differentiation, Hyperbolic Functions	3.6, 3.11, 3.7
7	Oct. 15 - Oct. 19	Rates of Change, Related Rates, Midterm Exam	3.7, 3.9
8	Oct. 22 - Oct. 26	Antiderivatives, Areas, Definite Integral	4.9, 5.1, 5.2
9	Oct. 29 - Nov. 2	Indefinite Integrals, Fundamental Theorem of Calculus	5.2 (cont.), 5.3, 5.4
10	Nov. 5 – Nov. 9 (No classes Nov. 8, 9)	Substitution Method, L'Hopital's Rule	5.5, 4.4
11	Nov. 12 – Nov. 16 (No classes Nov. 12 th)	Mean Value Theorem, Minimum and Maximum Values	4.2, 4.1
12	Nov. 19 – Nov. 23	How Derivatives Affect the Shape of a Curve	4.3
13	Nov. 26 – Nov. 30	Curve Sketching, Optimization	4.5, 4.7
14	Dec. 3 – Dec. 7 (No classes Dec. 7 th)	Newton's Method, Linear Approximation	4.8, 3.10
	Dec. 10– Dec. 14	Exam Period: Dec. 10 – 18 Grades Due: Dec 20	
	Dec. 17– Dec. 21		

Please Note:

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

Performance Requirements**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.

More specific details are found in the Student Rights and Student 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 Student Code of Conduct Policies.

Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a students' 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 / or 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
- 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 Student 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 Student 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 will not be graded until you show this signed certificate.

Specialized Supports

The Student Academic Support Services (SASS) department: Accessibility Services, Skill Centre and Wellness Services, work together to support student success at Keyano College.

Accessibility Services (CC167) supports student success through group and individualized instruction of learning, study and test taking strategies, and adaptive technologies. Students with documented disabilities, or who suspect a disability, can meet with the Learning Strategists to discuss accommodation of the learning barriers that they may be experiencing. Students who have accessed accommodations in the past are encouraged to visit our office at their earliest opportunity to discuss the availability of accommodations in their current courses. Individual appointments can be made by calling 780-791-8934

Skill Centre (CC119) provides a learning space where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff. Students visiting the centre have access to one-to-one or group tutoring, facilitated study groups, and assistance in academic writing. The Skill Centre's Peer Tutor program provides paid employment opportunities for

students who have demonstrated academic success and want to share what they have learned. Tutoring is available free to any students registered at Keyano College on a drop in basis, from 9:00 am to 5:00 pm Monday through Friday. Additional evening hours are subject to tutor availability and are posted in the Skill Centre.

Wellness Services (CC260) 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. The Mindfulness Room in CC260 is available as a quiet space for students to relax during regular office hours. Wellness Service welcomes students to participate in any of the group sessions offered throughout the academic year addressing such topics as Mindfulness and Text Anxiety. Individual appointments can be made by calling 780-791-8934.

Please watch your Keyano email for workshop announcements from our Student Academic Support Services team.