



Mathematics 100 Calculus 1 Fall, 2022

Instructor: George Ballinger
Office: Ewing 260
E-mail: ballinger@camosun.ca
Website: georgeballinger.ca (click the [MATH 100](#) link for course information)
Telephone: 250-370-3116
Timetable:

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30 am - 9:20 am	MATH 100-004 Room Y227	MATH 100-004 Room Y227	MATH 100-004 Room Y227	MATH 100-004 Room Y227	MATH 100-004 Room Y227
9:30 am - 10:20 am	MATH 100-003 Room Y227	MATH 100-003 Room Y227	MATH 100-003 Room Y227	MATH 100-003 Room Y227	MATH 100-003 Room Y227
10:30 am - 11:20 am					
11:30 am - 12:20 pm	Office Hour E260	Office Hour E260	Office Hour E260	Office Hour E260	Office Hour E260
12:30 pm - 1:20 pm	MATH 101-001 Room E348	MATH 101-001 Room E348	MATH 101-001 Room E348	MATH 101-001 Room E348	MATH 101-001 Room E348
1:30 pm - 2:20 pm					
2:30 pm - 3:20 pm					
3:30 pm - 4:20 pm					

Important Dates:	September 6	First day of class
	September 12	Add Course deadline
	September 12	Drop Course with 80% Tuition Refund deadline
	September 19	Deferred Tuition & Fee Payment deadline
	September 30	Truth and Reconciliation Day (no class)
	October 10	Thanksgiving Day (no class)
	October 20	"ShakeOut" earthquake preparedness drill at 10:20am
	November 11	Remembrance Day (no class)
	December 9	Last day of class
	December 10	Withdrawal deadline
	December 12-20	Final exam period

Calendar Description: For mathematics and science students. Topics include: limits, derivatives of algebraic, trigonometric, logarithmic and exponential functions, applications of differentiation and the Fundamental Theorem of Calculus. ~~Students will complete some assignments using Maple.~~ [3 Credits]

(Source: Camosun College Calendar
calendar.camosun.ca/preview_course_nopop.php?catoid=11&coid=19148)

Prerequisites: B in Pre-calculus 12, MATH 115 or MATH 097; or A in MATH 107; or assessment.

Note about Credit: Only one of MATH 100 or MATH 108 may be used toward a Camosun credential.

Exit Grade:

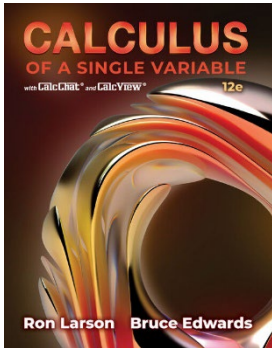
A grade of at least C (60%) is required when this course is used as a prerequisite for entry into MATH 101, MATH 126, STAT 218 or any other Camosun course.

Textbook:

Ron Larson and Bruce Edwards, *Calculus of a Single Variable*, 12th Edition, Cengage Learning, 2023.

Course Content:**Chapters and Sections**

- P. Preparation for Calculus
 - P.1 Graphs and Models
 - P.2 Linear Models and Rates of Change
 - P.3 Functions and Their Graphs
 - P.4 Review of Trigonometric Functions
- 1. Limits and Their Properties
 - 1.1 A Preview of Calculus
 - 1.2 Finding Limits Graphically and Numerically
 - 1.3 Evaluating Limits Analytically
 - 1.4 Continuity and One-Sided Limits
 - 1.5 Infinite Limits
- 2. Differentiation
 - 2.1 The Derivative and the Tangent Line Problem
 - 2.2 Basic Differentiation Rules and Rates of Change
 - 2.3 Product and Quotient Rules and Higher-Order Derivatives
 - 2.4 The Chain Rule
 - 2.5 Implicit Differentiation
 - 2.6 Related Rates
- 3. Applications of Differentiation
 - 3.1 Extrema on an Interval
 - 3.2 Rolle's Theorem and the Mean Value Theorem
 - 3.3 Increasing and Decreasing Functions and the First Derivative Test
 - 3.4 Concavity and the Second Derivative Test
 - 3.5 Limits at Infinity
 - 3.6 A Summary of Curve Sketching
 - 3.7 Optimization Problems
 - 3.8 Newton's Method
 - 3.9 Differentials
- 4. Integration
 - 4.1 Antiderivatives and Indefinite Integration
 - 4.2 Area
 - 4.3 Riemann Sums and Definite Integrals
 - 4.4 The Fundamental Theorem of Calculus
 - 4.5 Integration by Substitution
- 5. Logarithmic, Exponential, and Other Transcendental Functions
 - 5.1 The Natural Logarithmic Function: Differentiation
 - 5.2 The Natural Logarithmic Function: Integration
 - 5.3 Inverse Functions
 - 5.4 Exponential Functions: Differentiation and Integration
 - 5.5 Bases Other Than e and Applications
- 6. Differential Equations
 - 6.2 Growth and Decay
 - 6.3 Separation of Variables and the Logistic Equation
- 8. Integration Techniques and Improper Integrals
 - 8.6 Numerical Integration (*covered after sec 4.5*)



Learning Outcomes:	<p>The Intended Learning Outcomes for this course, as approved by the Education Council, are as follows. Upon completion of this course a student will be able to:</p> <ol style="list-style-type: none"> 1. Find the limit of elementary functions as the independent variable approaches some finite value or approaches infinity. 2. Define continuity. 3. Find the derivative of simple functions using the definition. 4. Find the derivative of functions (polynomial, trigonometric, logarithmic and exponential functions) using the product, quotient and chain rule. 5. Find the derivative using implicit differentiation. 6. Solve problems involving rates of change. 7. Find relative and absolute extrema of functions. 8. Sketch graphs of functions identifying such features as relative extrema, intervals where the function is increasing and decreasing, points of inflection, intervals where the function is concave up and concave down, and asymptotes. 9. Solve problems that involve maximizing or minimizing some variable associated with the problem. 10. Solve equations using Newton's method. 11. Find the area under a curve using the limit of the area of a set of approximating rectangles. 12. Evaluate a definite and an indefinite integral of polynomial, trigonometric, logarithmic and exponential functions using the Fundamental theorem of Calculus. 13. Use the Mean Value Theorem of integrals to find the mean value of a continuous function. 14. Evaluate integrals using the method of substitution. 15. Evaluate definite integrals using the trapezoidal rule and Simpson's rule. 16. Solve elementary differential equations using the method of separation of variables.
A&S Math Lab:	<p>Ewing 224: This drop-in centre is freely available for your use to work on math homework and to seek help from the instructional assistant. Hours are posted on the door or online at camosun.ca/services/academic-supports/help-centres/math-help.</p>
Academic Integrity:	<p>The Department of Mathematics and Statistics has prepared a handout called Student Guidelines for Academic Integrity to help you interpret college policies involving student conduct, academic dishonesty, plagiarism, etc. It is your responsibility to become familiar with the contents of the document and the college policies it references.</p>
Calculator Policy:	<p>As per department policy, the only calculator permitted for use on tests and the final exam is the Sharp EL-531 (or EL-510R) scientific calculator. No other calculator or any other electronic device including cell phones, electronic translators, smartwatches, etc. is allowed.</p>
Homework:	<p>There will be periodic assignments (7 all together) to be completed on the worksheets provided and handed in for marking. While collaboration with your classmates is permitted, you must submit your <i>own</i> work and ensure you don't let collaboration turn into plagiarism. You may not post assignment questions to, or copy solutions from, "cheat" websites such as Chegg.</p> <p>Due dates for assignments will be posted on the course webpage, and assignments are due before the end of class on the due dates. Solutions will be posted soon after assignments are collected. As such, <i>late assignments will not be accepted under any circumstances</i>. To accommodate situations where a student is unable to submit his or her assignment on time (e.g. due to illness), the lowest assignment mark will be dropped when computing the assignment average.</p>

Tests:

Three term tests are tentatively scheduled for the following dates:

- Test 1 (sec P.1-P.4, 1.1-1.5 and 2.1-2.4) on Friday, October 7
- Test 2 (sec 2.5-2.6 and 3.1-3.9) on Friday, November 4
- Test 3 (sec 4.1-4.5, 5.1-5.5 and 8.6) on Tuesday, December 6

If you miss a test for a legitimate reason such as illness, accident or family affliction, you should notify me (by email, phone/voicemail, or in person) *as soon as possible* and *before* the test (unless circumstances reasonably prevent you from doing so) and be prepared to provide supporting documentation upon your return. There will be no "make-up" tests, but instead, in the event of an excused absence, the mark from your final exam, or relevant subset thereof, will replace your test mark.

Final Exam:

A comprehensive, 3-hour final exam will take place during the final exam period of December 12-20. The specific date, time, and location will be announced on or about October 14. You must write the final exam at the scheduled time as per Camosun College's policy on final examinations. See camosun.ca/registration-records/policies-and-procedures-students/academic-policies-and-procedures-students.

Grade Calculation:

The final grade will be calculated according to the following breakdown:

7 Assignments: 15%*
 3 Term Tests: 45%
 Final Exam: 40%

* The lowest assignment mark will be dropped when calculating the assignment average. This allows you to miss one assignment for any reason, including illness, without penalty. *Late assignments will not be accepted.*

Grade Scale:

Final letter grades are assigned as follows:

0-49	50-59	60-64	65-69	70-72	73-76	77-79	80-84	85-89	90-100
F	D	C	C+	B-	B	B+	A-	A	A+

For information on Camosun College's grading policy, see policy E-1.5 online at camosun.ca/about/camosun-college-policies-and-directives/education/academic.