



## COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/math.html>

Ω Please note: the College electronically stores this outline for five (5) years only.  
It is **strongly recommended** you keep a copy of this outline with your academic records.  
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

### 1. Instructor Information

(a)	Instructor:	Stephen Benecke		
(b)	Office Hours:	10:00-12:00		
(c)	Location:	E254		
(d)	Phone:	250-370-3493	Alternative Phone:	NA
(e)	Email:	<a href="mailto:beneckes@camosun.bc.ca">beneckes@camosun.bc.ca</a>		
(f)	Website:	D2L		

### 2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

Upon completion of this course the student will be able to:

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.

### 3. Required Materials

- (a) Texts
- (b) Other

**SEE BELOW**

### 4. Course Content and Schedule

(This section can include: class hours, lab hours, out of class requirements and/or dates for quizzes, exams, lectures, labs, seminars, practicums, etc.)

**SEE BELOW**

### 5. Basis of Student Assessment (Weighting)

(This section should be directly linked to the Intended Learning Outcomes.)

- (a) Assignments
- (b) Quizzes
- (c) Exams
- (d) Other (e.g., Attendance, Project, Group Work)

**SEE BELOW**

**6. Grading System**

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

**Standard Grading System (GPA)**

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

**Temporary Grades**

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at [camosun.ca](http://camosun.ca) for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. (For these courses a final grade will be assigned to either the 3 <sup>rd</sup> course attempt or at the point of course completion.)
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

**7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course**

**LEARNING SUPPORT AND SERVICES FOR STUDENTS**

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at [camosun.ca](http://camosun.ca).

**STUDENT CONDUCT POLICY**

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy.

The policy is available in each School Administration Office, at Student Services,  
and the College web site in the Policy Section.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED



**Mathematics 100**  
**Calculus I**  
**Section 001**  
**Fall, 2016**

**Instructor:** Stephen Benecke  
**Office:** Ewing 254  
**E-mail:** Stephen.benecke@gmail.com  
**Website:** **D2L**  
**Telephone:** (250) 370-3493  
**Timetable:** **MTWRF 1:30-2:20 Young 227**

**Important Dates:**

September 6	First day of class
September 20	Fee deadline
October 10	Thanksgiving Day (no class)
October 20	"ShakeOut" earthquake preparedness drill at <b>10:20am</b>
November 8	Withdrawal deadline
November 11	Remembrance Day (no class)
December 9	Last day of class
December 12-17, 19-20	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. [4 Credits]

*(Source: Camosun College Calendar*  
[camosun.ca/learn/calendar/current/web/math.html#MATH100](http://camosun.ca/learn/calendar/current/web/math.html#MATH100))

**Prerequisites:** B in Pre-calculus 12, Principles of Math 12, or MATH 115; or A in MATH 107; or assessment.

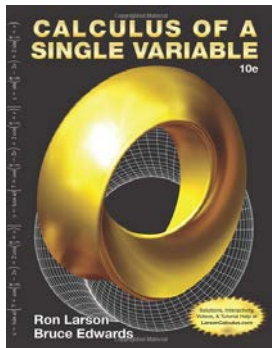
**Note about Credit:** Credit may be obtained for only one of MATH 100 and MATH 108.

**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.

**Required Textbook:**

Ron Larson and Bruce H. Edwards, *Calculus of a Single Variable*, 10th Edition, Brooks/Cole, 2014.

**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
- 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
  - 4.6 Numerical Integration
- 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 Differential Equations: Growth and Decay
  - 6.3 Separation of Variables and the Logistic Equation

<b>Learning Outcomes:</b>	<p>The Intended Learning Outcomes for this course, as approved by the Education Council, are as follows. Upon completion of this course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Find the limit of elementary functions as the independent variable approaches some finite value or approaches infinity.</li> <li>2. Define continuity.</li> <li>3. Find the derivative of simple functions using the definition.</li> <li>4. Find the derivative of functions (polynomial, trigonometric, logarithmic and exponential functions) using the product, quotient and chain rule.</li> <li>5. Find the derivative using implicit differentiation.</li> <li>6. Solve problems involving rates of change.</li> <li>7. Find relative and absolute extrema of functions.</li> <li>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.</li> <li>9. Solve problems that involve maximizing or minimizing some variable associated with the problem.</li> <li>10. Solve equations using Newton's method.</li> <li>11. Find the area under a curve using the limit of the area of a set of approximating rectangles.</li> <li>12. Evaluate a definite and an indefinite integral of polynomial, trigonometric, logarithmic and exponential functions using the Fundamental theorem of Calculus.</li> <li>13. Use the Mean Value Theorem of integrals to find the mean value of a continuous function.</li> <li>14. Evaluate integrals using the method of substitution.</li> <li>15. Evaluate definite integrals using the trapezoidal rule and Simpson's rule.</li> <li>16. Solve elementary differential equations using the method of separation of variables.</li> </ol>
<b>A&amp;S Math Lab:</b>	Ewing 224: This drop-in centre is freely available for your use to work on math homework and to seek help from the tutor on staff (see hours posted on door).
<b>Support and Services:</b>	There are a variety of learning support and services available that can assist you throughout your learning. For more information please see <a href="http://camosun.ca/services">camosun.ca/services</a> .
<b>Academic Integrity:</b>	The Department of Mathematics and Statistics has prepared a red handout called <a href="#">Student Guidelines for Academic Integrity</a> 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.
<b>Calculator Policy:</b>	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, nor any other electronic device including cell phones, electronic translators, iPods, etc., is allowed.
<b>Homework:</b>	There will be periodic assignments to be handed in for marking, details for which will be posted on the course website. LATE ASSIGNMENTS WILL NOT BE ACCEPTED.
<b>Maple Labs:</b>	Maple labs will take place in the computer lab Ewing 115 on the following Fridays: Sep 16, Sep 30, Oct 14, Oct 28, Nov 18, and Dec 2.

**Final Exam:**

A comprehensive, 3-hour final exam will take place during the final exam period of December 12-17, 19-20. 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/learn/calendar/current/procedures.html#academic](http://camosun.ca/learn/calendar/current/procedures.html#academic).

**Grade Calculation:**

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

Assignments: 15%  
 Maple Labs: 5%  
 Term Tests: 30%  
 Final Exam: 50%

**Grade Scale:**

Final letter grades are assigned as follows:

0-49	50-	60-	65-	70-	73-	77-	80-	85-	90-
<b>F</b>	<b>D</b>	<b>C</b>	<b>C+</b>	<b>B-</b>	<b>B</b>	<b>B+</b>	<b>A-</b>	<b>A</b>	<b>A+</b>

For information on Camosun College's grading policy, see policy E-1.5 on the webpage [camosun.ca/about/policies/policies.html#education](http://camosun.ca/about/policies/policies.html#education).