



CAMOSUN COLLEGE
School of Arts & Science
Department of Mathematics & Statistics

MATH-108-D02
Applied Calculus
Winter 2021

COURSE OUTLINE

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

Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

(a) Instructor	Dr. Garret Flowers
(b) Office hours	Monday, Tuesday, Friday (11:30 – 12:20)
(c) Location	Online
(d) Phone	N/A
(e) E-mail	flowersg@camosun.ca
(f) Website	D2L (online.camosun.ca)

Alternative: _____

2. Intended Learning Outcomes

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. Find the derivative of simple functions using the definition of the derivative.
3. Find the derivative of functions (polynomial, trigonometric, logarithmic and exponential functions) using the product, quotient and chain rule.
4. Find the derivative using implicit differentiation.
5. Solve problems involving rates of change.
6. Find relative and absolute extrema of functions.
7. 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.
8. Solve problems that involve maximizing or minimizing some variable associated with the problem.
9. Find the approximate area under a curve using the area of a set of approximating rectangles.
10. Evaluate a definite and an indefinite integral of polynomial, trigonometric, logarithmic and exponential functions using the Fundamental theorem of Calculus.
11. Evaluate integrals using the method of substitution.
12. Use integration to find the area between two curves.
13. Evaluate a definite and indefinite integral by the method of integration by parts.
14. Solve elementary differential equations using the method of separation of variables.
15. Solve problems using differential and integral calculus that involve applications from business and/or biological sciences.

3. Required Materials

(a) Texts

- Math 108 Course Notes (*strongly recommended*) – available on D2L
- CLP-1 and CLP-2 Differential and Integral Calculus Textbooks (*optional*) – available on D2L or at <https://www.math.ubc.ca/~CLP/CLP1/> and <https://www.math.ubc.ca/~CLP/CLP2/>

(b) Other

- Calculator (*recommended*). The Sharp EL-531TG or TH models. An “online” version is available for download at <http://www.sharp-calculators.com/en/content/id/121-learning-materials>

4. Course Content and Schedule

0 – Review

- 0.1 Factoring Polynomials
- 0.2 Rational Expressions
- 0.3 Exponents
- 0.4 Radicals
- 0.5 Polynomial, Radical and Rational Equations
- 0.6 Solving Inequalities
- 0.7 General Function Properties
- 0.8 Lines
- 0.9 Polynomial and Rational Functions
- 0.10 Exponential and Logarithmic Functions
- 0.11 Exponential Models
- 0.12 Trigonometric Functions

1 - Limits

- 1.1 Limit Concepts
- 1.2 Computing Limits and Limit Properties
- 1.3 Limits to Infinity & Horizontal Asymptotes
- 1.4 One-sided Limits & Vertical Asymptotes
- 1.5 Continuity

2 – The Derivative: What is it?

- 2.1 Rates of Change
- 2.2 Secant Lines and Tangent Lines
- 2.3 The Definition of the Derivative
- 2.4 Differentiability
- 2.5 Graphing the Derivative

3 – The Derivative: How Do We Find It?

- 3.1 Basic Derivative Properties
- 3.2 The Product and Quotient Rules
- 3.3 The Chain Rule
- 3.4 Derivatives of Exponential Functions
- 3.5 Derivatives of Logarithmic Functions
- 3.6 Derivatives of Trigonometric Functions
- 3.7 Higher-order Derivatives
- 3.8 Implicit and Logarithmic Differentiation

4 – The Derivative: Why Do We Care?

- 4.1 Related Rates
- 4.2 Mean Value Theorem
- 4.3 Introduction to Differential Equations
- 4.4 Linear Approximations
- 4.5 Increasing/Decreasing Functions and Extrema
- 4.6 Concavity and Inflection Points

- 4.7 Curve Sketching
- 4.8 Absolute Extrema
- 4.9 Optimization

5 – Integration

- 5.1 Antiderivatives
- 5.2 U-Substitution
- 5.3 The Definite Integral
- 5.4 The Fundamental Theorem of Calculus
- 5.5 Computing Definite Integrals
- 5.6 Area Between Curves
- 5.7 Integration by Parts
- 5.8 Separable Differential Equations

5. Basis of Student Assessment (Weighting)

- 7% - Assignments
- 3% - Mini-project
- 60% - Quizzes (6 quizzes at 10% each)
- 30% - Final Exam

Assignments: Weekly and due every Sunday by 5:00pm. Submitted online.

Mini-project: Small applications project. Due on the last day of class.

Quizzes: The dates for the quizzes are below (2 weeks apart, on Monday). Each is worth 10% of your final grade. You may not consult with other persons during these quizzes.

Monday, January 25
Monday, February 8
Monday, February 22
Monday, March 8
Monday, March 22
Monday, April 5

Final Exam: Given after the last day of class, during final exam period. More information to be provided later.

6. Grading System

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|----------|---------------------------------|
| X | Standard Grading System (GPA) |
| | Competency Based Grading System |

7. College Supports, Services and Policies



Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ <http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence, Student Ancillary Fees, Academic Integrity, Grade Review & Appeals, Student Misconduct and Academic Accommodations for Students with Disabilities and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. 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		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.

NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.
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B. 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 at <http://camosun.ca/about/policies/index.html> 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 are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
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.