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

MATH-100-D02
Calculus 1
Fall 2020

COURSE OUTLINE

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

Ω *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

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(a)	**Instructor**	Dan Bergerud		
(b)	**Office hours**	Mon-Fri, 10:30-11:20		
(c)	**Location**	Online		
(d)	**Phone**	250-370-3495 (not monitored)	**Alternative:**	n/a
(e)	**E-mail**	bergerud@camosun.bc.ca		
(f)	**Website**	none		

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. 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

Textbook: Ron Larson and Bruce Edwards, *Calculus of a Single Variable,* 11th Edition, Nelson (Cengage), 2018.
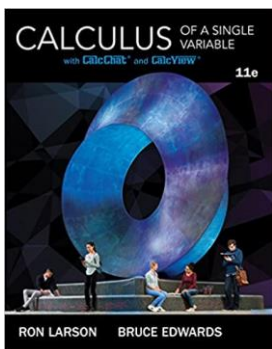
Calculator: Sharp EL-531 (or EL-510R) scientific calculator recommended.

4. Course Content and Schedule

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)*

5. Basis of Student Assessment (Weighting)

Assignments: 30%*
Term Tests: 40%
Final Exam: 30%

* *Note:* The lowest assignment mark will be dropped when calculating the assignment average. This allows you to miss one assignment without penalty.

6. Grading System

X   Standard Grading System (GPA)

☐   Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

Math Labs: http://camosun.ca/services/help-centres/math-help.html

8. 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 and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, 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.

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	*Incomplete*: 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	*In progress*: 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	*Compulsory Withdrawal*: 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.