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

MATH-191-X01
Applied Math for Civil/Mech 1
Winter 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

(a)	**Instructor**	Raymond Lai
(b)	**Office hours**	Mon & Fri by appt. Tues: 11:30-1:20; Wed 12:30-1:20; Th 11:30-12:20
(c)	**Location**	CBA 152
(d)	**Phone**	250-370-4491 **Alternative:**
(e)	**E-mail**	lai@camosun.bc.ca
(f)	**Website**	https://sites.camosun.ca/raymondali/

2. Intended Learning Outcomes

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

1. Evaluate limits of functions. Using the limit definition, find derivatives of simple algebraic functions. Use derivatives to determine the slope of the tangent line to a curve, velocity, acceleration, and rates of change.
2. Use the power, product, quotient and chain rules to differentiate algebraic, trigonometric, logarithmic and exponential functions. Use implicit differentiation.
3. Find tangents and normals to given functions. Use Newton's Method to find an approximate solution to an equation. Solve problems involving related rates, curve sketching, maxima and minima, and parametrically defined curves. Find differentials, estimate errors, and linearize functions.
4. Find antiderivatives of functions and evaluate both indefinite and definite integrals. Use the trapezoidal rule and Simpson's Rule to approximate a definite integral.
5. Use integration to solve applications problems including the area between curves, volumes of solids of revolution, and centroids.
6. Calculate determinants of 2x2 and 3x3 matrices. Add, subtract and multiply matrices. Calculate the inverse of a matrix. Solve 2x2 and 3x3 linear systems using Gauss-Jordan elimination, augmented matrices and inverse matrices.

3. Required Materials

(a) Reference: Allyn J. Washington, Basic Technical Mathematics with Calculus, SI Version, 10th Ed.
(b) Scientific Calculator (Graphing Calculators are not permitted)

4. Course Content and Schedule

Section 1	Limits [~ 2.5 hours] (Reference section 23.1)
Section 2	Slope of a Tangent to a Curve [~1 hour] (Reference section 23.2)
Section 3	The Derivative [~1 hour] (Reference section 23.2)
Section 4	Derivatives of Polynomials [~1 hour] (Reference section 23.5)
Section 5	Derivatives as an instantaneous Rate of Change [~0.5 hour] (Reference section 23.4)
Section 6	Higher Derivatives [~0.5 hour] (Reference section 23.9)
Section 7	Derivatives of Products and Quotients [~2 hours] (Reference section 23.6)
Section 8	Derivatives of Powers of Functions & Chain Rule [~1.5 hours] (Reference section 23.7)
Section 9	Derivatives of Implicit Functions [~0.5 hour] (Reference section 23.8)
Section 10	Tangents and Normals [~1 hour] (Reference section 24.1)
Section 11	Newton's Method for Solving Equations [~1 hour] (Reference section 24.2)
Section 12	Curvilinear Motion [~1 hour] (Reference section 24.3)
Section 13	Related Rates [~2.5 hours] (Reference section 24.4)
Section 14	Using Derivatives in Curve Sketching [~2 hours] (Reference sections 24.5)
Section 15	Applied Max/Min Problems [~2 hours] (Reference section 24.7)
Section 16	Linear Approximations [~1.5 hours] (Reference section 24.8)
Section 17	Derivatives of Sine and Cosine Functions [~1.5 hours] (Reference section 27.1)
Section 18	Derivatives of the Other Trigonometric Functions [~1 hour] (Reference section 27.2)
Section 19	Derivatives of the Inverse Trigonometric Functions [~1 hour] (Reference section 27.3)
Section 20	Derivatives of Logarithmic Functions [~1.5 hours] (Reference section 27.5)
Section 21	Derivatives of Exponential Functions [~0.5 hour] (Reference section 27.6)
Section 22	Applications [~1 hour] (Reference section 27.4 and section 27.8)
Section 23	Antiderivatives [~0.5 hour] (Reference section 25.1)
Section 24	Indefinite Integral [~1 hour] (Reference section 25.2)
Section 25	Area Under a Curve [~0.5 hour] (Reference section 25.3)
Section 26	Definite Integral [~0.75 hour] (Reference section 25.4)
Section 27	Numerical Integration: Trapezoidal Rule [~0.75 hour] (Reference section 25.5)
Section 28	Numerical Integration: Simpson's Rule [~0.5 hour] (Reference section 25.6)
Section 29	Applications of the Indefinite Integral [~1 hour] (Reference section 26.1)
Section 30	Areas by Integration [~1.5 hours] (Reference section 26.2)
Section 31	Volumes by Integration [~1 hour] (Reference section 26.3)
Section 32	Centroids (2-dimensional only) [~1 hour] (Reference section 26.4)
Section 33	Other Applications [~1.5 hours] (Reference section 26.6)
Section 34	Introduction to Matrices: Definitions and Basic Operations [~0.5 hour] (Reference section 16.1)
Section 35	Matrix Multiplication [~1.5 hours] (Reference section 16.2)
Section 36	Matrix Inverses [~1.5 hours] (Reference section 16.2 and section 16.3)
Section 37	Matrices and Linear Equations [~0.5 hour] (Reference section 16.4)
Section 38	Gaussian Elimination and Gauss Jordan Elimination [~1 hour] (Reference section 16.5)

5. Basis of Student Assessment (Weighting)

Your course grade will be determined by using one of the following two methods:

(a) <u>If your performance on each of the four term tests is at least 30%,</u> your course grade can be determined 100% by your performances on the term tests using the following weighting – Table 1 (you do not need to write the comprehensive final exam but you can opt in if you want to – see Table 2 below):

Table 1	Test 1	Test 2	Test 3	Test 4
Tentative Date	Feb 7 (Fri)	Mar 6 (Fri)	Mar 20 (Fri)	Apr 6 (Mon)
Weight	27%	27%	27%	19%

(b) If you fall short of getting at least 30% in any of the term tests, you will need to write the comprehensive final exam and your course grade will then be determined using the following weighting – Table 2:

Table 2	Test 1	Test 2	Test 3	Test 4	Comprehensive final Exam
Weight	13.5%	13.5%	13.5%	9.5%	50%
	Term tests together count for 50%				

The final examination will take place during the period of Apr. 14th to Apr. 22nd.

Note:
- Thorough understanding of the examples discussed in class and the assignments/practices will be essential for success on the term tests.
- There is no makeup for missed test (except for documented medical reasons). Requests for makeup tests due to illness must be supported by your physician's note.
- Regardless of what your term mark is, you can opt in to write the comprehensive final examination (by notifying the instructor with email during the last week of classes and receiving confirmation from the instructor).
- Once you opt in writing the final examination, you cannot go back to use 100% term work for your course grade.
- You can get a better grade or a worse course grade depending on whether your performance in the final examination is better or worse than that in the term, for instance,

	Term Test Minimum	Weighted Term Tests	Final Exam	Course
Student 1	40%	80%	Do not write	80%
Student 2	40%	80%	(Opt in to write) 90%	85%
Student 3	40%	80%	(Opt in to write) 60%	70%
Student 4	40%	55%	(Opt in to write) 75%	65%
Student 5	40%	55%	(Opt in to write) 45%	50%
Student 6	20%	80%	(Need to write) 90%	85%
Student 7	20%	80%	(Need to write) 60%	70%
Student 8	20%	55%	(Need to write) 75%	65%
Student 9	20%	55%	(Need to write) 45%	50%

6. Grading System

| X | Standard Grading System (GPA)

| | Competency Based Grading System

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

How to do well in the course and where to get help
1. Do not skip classes
2. Start working on the exercises as soon as we finish a section
3. It is important to understand the principles involved rather than to memorize a method of solution – try variations of questions
4. Studying in groups is an efficient way to learn mathematics; however, make sure you can solve the problems yourself
5. Extra help available from assistant at the Math Lab located at Technologies Centre (TEC) Room 142 (phone: 370-4492). 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 the door).

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.