



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

MATH-191-DX01
Applied Math for Civil/Mech 1
Winter 2021

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)	Virtual Office Hours (using Blackboard Collaborate Ultra in D2L):	Monday	Thursday
		8:30am – 9:20am 9:30am – 10:20am,	12:30 pm – 1:20pm 1:30 pm – 2:20pm
		Also by email appointment (preferably 24 hours in advance and first come first booked) – check the module “Email Appointment Confirmation” in the D2L Content Page for time available	
(c)	Office Location:	Blackboard Collaborate Ultra in D2L	
(d)	Office Phone:	250-370-4491	
(e)	Email:	lai@camosun.bc.ca	
(f)	Website:	https://sites.camosun.ca/raymondlai/	

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) Course notes (accessible from the course D2L site)
- (b) Reference: Allyn J. Washington, Basic Technical Mathematics with Calculus, SI Version, 10th Ed. (If you purchase an etext from our bookstore, use the course ID lai24669 to gain access.)
- (c) Other: Scientific Calculator (Graphing Calculators are not permitted.)

4. Course Content and Schedule

- Section 1 Limits [~ 2.5 to 3 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 23.3)
 Section 4 Derivatives of Polynomials [~ 1 hour] (Reference section 23.5)
 Section 5 Derivatives as an Instantaneous Rate of Change [~ 0.5 to 1 hour] (Reference section 23.4)
 Section 6 Higher Derivatives [~ 0.5 to 1 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 to 2 hours] (Reference section 23.7)
 Section 9 Derivatives of Implicit Functions [~ 0.5 to 1 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 to 3 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 to 2 hours] (Reference section 24.8)
- Section 17 Derivatives of Sine and Cosine Functions [~ 1.5 to 2 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 to 2 hours] (Reference section 27.5)
 Section 21 Derivatives of Exponential Functions [~ 0.5 to 1 hour] (Reference section 27.6)
 Section 22 Applications of Derivative [~ 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 to 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 of Definite Integrals [~ 1.5 to 2 hours] (Reference section 26.6)
- Section 34 Introduction to Matrices: Definitions and Basic Operations
 [~ 0.5 to 1 hour] (Reference section 16.1)
 Section 35 Matrix Multiplication [~ 1.5 to 2 hours] (Reference section 16.2)
 Section 36 Matrix Inverses [~ 1.5 to 2 hours] (Reference section 16.2 and section 16.3)
 Section 37 Matrices and Linear Equations [~ 0.5 to 1 hour] (Reference section 16.4)
 Section 38 Gaussian Elimination and Gauss Jordan Elimination [~ 2 hours] (Reference section 16.5)

	Test 1	Test 2	Test 3	Test 4
Tentative Date (Victoria local time)	Feb 11 th (Thurs)	Mar 11 th (Thurs)	Apr 1 st (Thurs)	Apr 15 th (Thurs)
Sections Covered	1 to 9	10 to 19	20 to 32	33 to 38

5. Basis of Student Assessment (Weighting)

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

- (a) If your performance on each of the four term tests is at least 30%, 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
Weight	24%	32%	27%	17%

- (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. The final examination will take place during the period of Apr 19th to Apr 27th.

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	12%	16%	13.5%	8.5%	50%
	(Term tests together count for 50%)				

Notes:

- Thorough understanding of the examples discussed in class and in the notes and completion of the exercises in the notes will be essential for success on the term tests.
- There is no makeup for missed test.
- 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 between Apr 12th and Apr 16th).
- 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%

Instructions on writing Online Tests:

- 1. Download and print out this test from the course D2L site.
- 2. Complete the test in ink (or using pencil), please make sure it is dark enough for scan to be legible).
- 3. Scan the finished test and save it as one single pdf file.
- 4. Submit your pdf file before the due time.
- The tests are individual and closed book. The only aid allowed is non-graphing non-programmable scientific calculator.
- You have 50 minutes to write each test. Taking into consideration of the work before and after writing the test (such as printing and scanning), the start time is 2 pm and the due time of submission is 3:20 pm. If your submission is late, your grade may be adjusted with the late factor:

$$\text{Late Factor} = \frac{\text{Time Allowed}}{\text{Time Allowed} + \text{Your Overtime}}$$

If you make multiple submissions and your last submission is late, the late factor (with overtime computed using the time of your last submission) will be applied to the whole test (not only to the portion of the test you submitted late).

- You earn credits by using **only** the method(s) used in the examples in class and/or in the notes. Other methods of solutions are not accepted.
- For full marks, show all your work (with details comparable to the examples discussed in class and/or shown in the course notes) and simplify all your answers to the best of your ability.
- Check your scan contains all pages of your solutions before submission.

6. Grading System

Standard Grading System (GPA)

Competency Based Grading System

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.



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. Study efficiently:
 - Working with each other is a smart way to learn mathematics; however, make sure you can solve problems yourself.
 - It is important **not** to spend too much time on a single exercise – as a general rule of thumb, if you spend 15 minutes either staring at a problem not knowing what to do or having trouble finding arithmetic mistakes you might have made, move on to the next exercise (email me your work and we can go over it together – there may be typo in the answer provided, check typo corrections posted on the D2L course site).
 - Need extra help? Check out the module “Where can I get help?” under My Tools/Content on the D2L course site.

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)

<i>Percentage</i>	<i>Grade</i>	<i>Description</i>	<i>Grade Point Equivalency</i>
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

<i>Grade</i>	<i>Description</i>
COM	<i>The student has met the goals, criteria, or competencies established for this course, practicum or field placement.</i>
DST	<i>The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.</i>
NC	<i>The student has not met the goals, criteria or competencies established for this course, practicum or field placement.</i>

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.

<i>Temporary Grade</i>	<i>Description</i>
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	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.</i>

Week	Math-191-DX01	Course Notes Materials to Study this Week	Thursday Class
1	Jan 11 - 15	Sections 1 and 2	Study Session
2	Jan 18 - 22	Sections 3 to 6	Study Session
3	Jan 25 - 29	Sections 7 to 9	Study Session
4	Feb 1 - 5	Sections 10 to 12	Study Session
5	Feb 8 - 12	Sections 13 and 14	Test 1 (Feb 11)
6	Feb 15 - 19	Reading Break	Reading Break
7	Feb 22 - 26	Sections 15 to 17	Study Session
8	Mar 1 - 5	Sections 18 to 20	Study Session
9	Mar 8 - 12	Sections 21 to 25	Test 2 (Mar 11)
10	Mar 15 - 19	Sections 26 to 30	Study Session
11	Mar 22 - 26	Sections 31 to 33	Study Session
12	Mar 29 - Apr 2	Sections 34 and 35	Test 3 (Apr 1)
13	Apr 5 - 9	Sections 36 and 37	Study Session
14	Apr 12 - 16	Section 38	Test 4 (Apr 15)
Final Exam Period Apr 19 - 27			