COURSE SYLLABUS

COURSE TITLE: MATH-191-Applied Math for Civil/Mech 1
CLASS SECTION: X01
TERM: 2025W
COURSE CREDITS: 3
DELIVERY METHOD(S): Interurban Campus

Camosun College respectfully acknowledges that our campuses are situated on the territories of the Lək̓ʷəŋən (Songhees and Kosapsum) and WSÁNEĆ peoples. We honour their knowledge and welcome to all students who seek education here.

INSTRUCTOR DETAILS

NAME: Raymond Lai	OFFICE: CBA 152
PHONE: 250-370-4491	OFFICE HOURS:
EMAIL: lai@camosun.ca	Monday 3:30pm – 4:20pm; Tuesday 1:30pm – 3:20pm; Thursday 1:30pm – 2:20pm, and by appointment

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

Students will be introduced to the topics in introductory calculus and matrix algebra necessary to achieve competency in civil and mechanical engineering technology. In calculus, students will study limits; differentiation of algebraic, trigonometric, logarithmic and exponential functions; applications of derivatives; indefinite and definite integrals; and applications of integrals. Students will also learn about matrix operations, matrix inverses, and solving 2x2 and 3x3 linear systems using a variety of methods. Applications to civil and mechanical engineering are included throughout the course.

PREREQUISITE(S):	CO-REQUISITE(S):	EQUIVALENCE(S):
One of: • C+ in Pre-calculus 12 • C+ in MATH 097 • C in MATH 107 • C in MATH 115	Not Applicable	Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course a 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

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

(a) Course notes (accessible from the course D2L site)

(b) Optional Reference: Allyn J. Washington, Basic Technical Mathematics with Calculus, SI Version, 12th Ed.
(If you purchase an etext from our bookstore, use the course ID lai76494 to gain access.)
Copies available at the library.

(c) Other: Scientific Calculator (EL-W516 strongly recommended; Graphing Calculators are not permitted.)

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

WEEK or DATE RANGE	ACTIVITY or TOPIC	
Week 1 (1/6 – 1/10)	Section 1.1 Limits [~ 2.5 to 3 hours]	Ch 1: The Derivative
	Section 1.2 Slope of a Tangent to a Curve and the Derivative [~ 2 hours]	

WEEK or DATE RANGE	ACTIVITY or TOPIC	
Week 2 (1/13 – 1/17)	Section 1.3 Derivatives of Polynomials [~ 1 hour]	Ch 1: The Derivative
	Section 1.4 Derivatives as an Instantaneous Rate of Change and Higher Derivatives [~ 1 to 2 hours]	
	Section 1.5 Derivatives of Products and Quotients [~ 2 hours]	
Week 3 (1/20 – 1/24)	Section 1.6 Derivatives of Powers of Functions & Chain Rule [~ 1.5 to 2 hours]	
	Section 1.7 Derivatives of Implicit Functions [~ 0.5 to 1 hour]	
	Section 2.8 Tangents and Normals [~ 1 hour]	Ch 2: Applications of the Derivative
	Section 2.9 Newton's Method for Solving Equations [~ 1 hour]	
Week 4 (1/27 – 1/31)	Section 2.10 Curvilinear Motion [~ 1 hour]	
	Section 2.11 Related Rates [~ 2.5 to 3 hours]	
	Section 2.12 Using Derivatives in Curve Sketching [~ 2 hours]	
Week 5 (2/3 – 2/7)	Study Sessions to prepare for Test 1: sections 1 – 10	
	Section 2.13 Applied Max/Min Problems [~ 2 hours]	
	Test 1: sections 1 – 9 (tentatively on 2/7)	
Week 6 (2/12 – 2/16)	Section 2.14 Linear Approximations [~ 1.5 to 2 hours]	
	Section 3.15 Derivatives of Sine and Cosine Functions [~ 1.5 to 2 hours]	Ch 3: Transcendental Functions
Week 7 (2/17 – 2/21)	**Family Day (Feb 17) and Reading Break (Feb 18 - 21) – College Closed**	
Week 8 (2/26 – 3/1)	Section 3.15 (Continued)	
	Section 3.16 Derivatives of Tangent, Cotangent, Secant and Cosecant Functions [~ 1 hour]	
	Section 3.17 Derivatives of the Inverse Trigonometric Functions [~ 1 hour]	
	Section 3.18 Derivatives of Logarithmic Functions [~ 1.5 to 2 hours]	
	Section 3.19 Derivatives of Exponential Functions [~ 0.5 to 1 hour]	
Week 9 (3/3 – 3/7)	Study Sessions to prepare for Test 2	
	Section 3.20 Applications of Derivative [~ 1 hour]	
	Section 4.21 Antiderivatives and Indefinite Integral [~ 2 hours]	Ch 4
	Test 2: sections 10 – 17 (tentatively on 3/7)	

WEEK or DATE RANGE	ACTIVITY or TOPIC	
Week 10 (3/10 – 3/14)	Section 4.22 Applications of the Indefinite Integral [~ 1 hour]	Ch 4: Integration and its Applications
	Section 4.23 Definite Integral [~ 0.75 hour]	
	Section 4.24 Areas by Integration [~ 2 hours]	
	Section 4.25 Volumes by Integration [~ 1 hour]	
Week 11 (3/17 – 3/21)	Section 4.26 Centroids (2-dimensional and constant density only) [~ 1 hour]	
	Section 4.27 Other Applications of Definite Integrals [~ 1.5 to 2 hours]	
	Section 4.28 Numerical Integration: Trapezoidal Rule [~ 0.75 hour]	
	Section 4.29 Numerical Integration: Simpson's Rule [~ 0.5 hour]	
Week 12 (3/24 – 3/28)	Study Sessions to prepare for Test 3	
	Section 5.30 Introduction to Matrices: Definitions and Basic Operations [~ 0.5 to 1 hour]	Ch 5: Matrices & Systems of Linear Equations
	Section 5.31 Matrix Multiplication [~ 1.5 to 2 hours]	
	Test 3: sections 18 – 27 (tentatively on 3/28)	
Week 13 (3/31 – 4/4)	Section 5.31 (Continued)	
	Section 5.32 Matrix Inverses [~ 1.5 to 2 hours]	
	Section 5.33 Matrices and Linear Equations [~ 0.5 to 1 hour]	
	Section 5.34 Gauss Jordan Elimination [~ 2 hours]	
Week 14 (4/7 – 4/11)	Section 5.34 (Continued)	
	Study Sessions to prepare for Test 4	
	Test 4: sections 28 – 34 (tentatively on 4/11)	
Apr 14 – Apr 25	Final Exam Period **(Plan your travel and book your flights wisely)**	

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced noticed is required. Deadlines can be reviewed on the CAL exams page.
https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams

EVALUATION OF LEARNING

WEIGHTS (DATES)	Assignments	Term Tests
Assignment 1 /Test 1	5% (due end of class Friday Jan 31)	20% (Friday Feb 7)
Assignment 2 /Test 2	5% (due end of class Friday Feb 28)	20% (Friday Mar 7)
Assignment 3 /Test 3	5% (due end of class Friday Mar 21)	20% (Friday Mar 28)
Assignment 4 /Test 4	6% (due end of class Friday Apr 4)	19% (Friday Apr 11)
TOTAL	100%	

Notes:

- Assignment solutions will be posted in D2L soon after the due time, hence late assignments will not earn credits.
- If you plan to use this course to fulfill the pre-requisite requirement for Math 193, your performance in this course must be at least 60% (letter grade C).
  Please check the College Website for the most updated information.

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the Grade Review and Appeals policy for more information. https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf

SCHOOL OR DEPARTMENTAL INFORMATION

Interurban Math Lab (TEC 142) – 370-4492

Services: Individual free tutoring and study space

Schedule: posted on the door

Format: Drop in – first-come first-served

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit camosun.ca/services.

Support Service	Website
Academic Advising	camosun.ca/services/academic-supports/academic-advising
Accessible Learning	camosun.ca/services/academic-supports/accessible-learning
Counselling	camosun.ca/services/health-and-wellness/counselling-centre
Career Services	camosun.ca/services/co-operative-education-and-career-services
Financial Aid and Awards	camosun.ca/registration-records/financial-aid-awards
Help Centres (Math/English/Science)	camosun.ca/services/academic-supports/help-centres
Indigenous Student Support	camosun.ca/programs-courses/iecc/indigenous-student-services
International Student Support	camosun.ca/international
Learning Skills	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills
Library	camosun.ca/services/library
Office of Student Support	camosun.ca/services/office-student-support
Ombudsperson	camosun.ca/services/ombudsperson
Registration	camosun.ca/registration-records/registration
Technology Support	camosun.ca/services/its
Writing Centre	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Integrity

Students are expected to comply with all College policy regarding academic integrity; which is about honest and ethical behaviour in your education journey. The following guide is designed to help you understand your responsibilities: https://camosun.libguides.com/academicintegrity/welcome
Please visit https://camosun.ca/sites/default/files/2021-05/e-1.13.pdf for Camosun's Academic Integrity policy and details for addressing and resolving matters of academic misconduct.

Academic Accommodations for Students with Disabilities

Camosun College is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging appropriate academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a documented disability and think you may need accommodations, you are strongly encouraged to contact the Centre for Accessible Learning (CAL) and register as early as possible. Please visit the CAL website for more information about the process of registering with CAL, including important deadlines: https://camosun.ca/cal

Academic Progress

Please visit https://camosun.ca/sites/default/files/2023-02/e-1.1.pdf for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit https://camosun.ca/sites/default/files/2021-05/e-2.2.pdf for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit https://camosun.ca/registration-records/tuition-fees#deadlines.

Grading Policy

Please visit https://camosun.ca/sites/default/files/2021-05/e-1.5.pdf for further details about grading.

Grade Review and Appeals

Please visit https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf for policy relating to requests for review and appeal of grades.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal (see Medical/Compassionate Withdrawals policy). Please visit https://camosun.ca/services/forms#medical to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized Violence Policy: https://camosun.ca/sites/default/files/2021-05/e-2.9.pdf and camosun.ca/services/sexual-violence-support-and-education.

To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-370-3841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at https://camosun.ca/sites/default/files/2021-05/e-2.5.pdf to understand the College's expectations of academic integrity and student behavioural conduct.

Looking for other policies?

The full suite of College policies and directives can be found here: https://camosun.ca/about/camosun-college-policies-and-directives

Changes to this Syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.