COURSE SYLLABUS

COURSE TITLE: MATH-191-Applied Math for Civil/Mech 1

CLASS SECTION: X02

TERM: 2024F

COURSE CREDITS: 3

DELIVERY METHOD(S): Lecture

INSTRUCTOR DETAILS

NAME: Susie Wieler

EMAIL: wielers@camosun.ca

OFFICE: CBA 147

HOURS: Mondays, Tuesdays, Thursdays, Fridays 12 – 1 PM or 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):

One of:

C+ in Pre-calculus 12

C+ in MATH 097

C in MATH 107

C in MATH 115

COURSE LEARNING OUTCOMES / OBJECTIVES

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

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.

Use the power, product, quotient and chain rules to differentiate algebraic, trigonometric, logarithmic and exponential functions. Use implicit differentiation.

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.

Find antiderivatives of functions and evaluate both indefinite and definite integrals. Use the trapezoidal rule and Simpson's Rule to approximate a definite integral.

Use integration to solve applications problems including the area between curves, volumes of solids of revolution, and centroids.

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

Coursepack available for printing or tablet use.

SHARP EL-W516 or **CASIO fx-991ES PLUS C** scientific calculator. Graphing calculators are not permitted.

myopenmath.com account

Course ID : 230519

Enrollment key: homework

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	OTHER NOTES
Weeks 1-13	MyOpenMath assignments due Sundays at 11:59 pm	
Monday, Sept 23	Test 1	
Monday, Oct 28	Test 2	
Monday, Dec 2	Test 3	
Dec 9-17	Final Exam period (schedule posted Oct 18)	

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 advance notice is required. Deadlines can be reviewed on the CAL exams page. https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams

TOPICS:
Chapter 23 The Derivative
       Limits (23.1)
       The Slope of a Tangent to a Curve (23.2)
       The Derivative (23.3)
       The Derivative as an Instantaneous Rate of Change (23.4)
       Derivatives of Polynomials (23.5)
       Derivatives of Products and Quotients of Functions (23.6)
       The Derivative of a Power of a Function (23.7)
       Differentiation of Implicit Functions (23.8)
       Higher Derivatives (23.9)
Chapter 24 Applications of the Derivative
       Tangents and Normals (24.1)
       Newton's Method (24.2)
       Curvilinear Motion (24.3)
       Related Rates (24.4)
       Using Derivatives in Curve Sketching (24.5)
       Applied Maximum and Minimum Problems (24.7)
       Differentials and Linear Approximations (24.8)
Chapter 27 Transcendental Functions
       Derivatives of the Sine and Cosine Functions (27.1)
       Derivatives of the Other Trigonometric Functions (27.2)
       Derivatives of the Inverse Trigonometric Functions (27.3)
       Derivatives of the Logarithmic Function (27.5)
       Derivatives of the Exponential Function (27.6)
       Applications (27.8)

Chapter 25 Integration
       Antiderivatives (25.1)
       The Indefinite Integral (25.2)
       The Area Under a Curve (25.3)
       The Definite Integral (25.4)
       Numerical Integration: The Trapezoidal Rule (25.5)
       Simpson's Rule (25.6)
Chapter 26 Applications of Integration
       Applications of The Definite Integral (26.1)
       Areas by Integration (26.2)
       Volumes by Integration (26.3)
       Centroids (26.4)
       Other Applications (26.6)
Chapter 16 Matrices; Systems of Linear Equations
       Definitions and Basic Operations (16.1)
       Multiplication of Matrices (16.2)
       Finding the Inverse of a Matrix (16.3)
       Matrices and Linear Equations (16.4)
       Gaussian Elimination (16.5)
       Higher-Order Determinants (16.6)

EVALUATION OF LEARNING

DESCRIPTION		WEIGHTING
Assignments (13)		10%
Tests (weighted 25%, 20%, 15% from highest to lowest marks)		60%
Final Exam		30%
	TOTAL	100%

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

Policy regarding missed tests:

- If a student misses one (1) test for any reason, their final exam mark will also be used as their mark on the missed test.
- If a student has already missed one test and needs to miss another test, the student is required to contact me before the test. Documentation to verify the reason for the absence may be requested, and alternate arrangements will be made on a case-by-case basis. Students who fail to contact me will receive a mark of zero (0) on the missed test(s).

COURSE GUIDELINES & EXPECTATIONS

The following content is available on D2L:

- Lecture notes will be posted shortly after each class.
- Scans of the Problem Sets from the following textbook are available for extra practice, along with answers and step-by-step solutions: *Basic Technical Mathematics, With Calculus, SI Version, Tenth Edition* by A. Washington and M. Boue.
- Practice Questions for each test, along with their step-by-step solutions.
- Test solutions will be posted shortly after each test.

SCHOOL OR DEPARTMENTAL INFORMATION

Interurban Math Lab
 Services: Individual tutoring and study space
 Location: TEC 142
 Schedule: posted on the door
 Format: Drop in - first-come, first-served

Chair of the Math & Stats Department: Patrick Montgomery
 Phone: 250-370-3502
 Office: Ewing 268, Lansdowne Campus
 Email: montgomeryp@camosun.ca

The Department of Mathematics and Statistics has prepared a handout called *Student Guidelines for Academic Integrity* to help you interpret college policies involving student conduct, academic dishonesty, plagiarism, etc. It is your responsibility to become familiar with the contents of the document and the college policies it references.

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.

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.