

# COURSE SYLLABUS



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

CLASS SECTION: X01

TERM: Fall 2021

COURSE CREDITS: 4

DELIVERY METHOD(S): Face-to-Face

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̓SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.

Learn more about Camosun's [Territorial Acknowledgement](#).

***For COVID-19 information please visit <https://legacy.camosun.ca/covid19/index.html>***

*Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.*

## INSTRUCTOR DETAILS

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NAME: Leah Howard

EMAIL: [HowardL@camosun.ca](mailto:HowardL@camosun.ca)

OFFICE: CBA 151

HOURS: Mon/Tues/Fri 11:30-1:20 and Thurs 12:30-1:20

WEBSITE: [www.leahhoward.com](http://www.leahhoward.com)

*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

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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

CO-REQUISITE(S): Not Applicable

EXCLUSION(S): Not Applicable

## COURSE LEARNING OUTCOMES / OBJECTIVES

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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  $2 \times 2$  and  $3 \times 3$  matrices. Add, subtract and multiply matrices. Calculate the inverse of a matrix. Solve  $2 \times 2$  and  $3 \times 3$  linear systems using Gauss-Jordan elimination, augmented matrices and inverse matrices.

## REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

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- \* Scientific calculator. (Graphing calculators are not permitted.)  
The Sharp EL-W516 is recommended; available at the Camosun Bookstore or Walmart, Staples etc.
- \* No required textbook. Suggested homework problems and answers are on D2L.
- \* An optional textbook is *Basic Technical Mathematics with Calculus*, SI Version (10th Ed) by Washington and Boue.

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

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

A detailed pacing schedule can be found on the last page of this outline.

Course Topics:

Ch.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)

Ch.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)

Ch.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)

Ch.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)

Ch.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)

Ch.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)

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 notice is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

## EVALUATION OF LEARNING

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DESCRIPTION	WEIGHTING
Open-Book Weekly Quizzes (Beginning of class on Tuesdays, starting in Week 2)	15% total
Test 1	15%
Test 2	15%
Test 3	15%
Final Exam	40%
Tests and exam will be closed-book. Exams are Dec 13-21. You must be available at the scheduled time.	
	<b>TOTAL</b>
	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](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information.  
<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

## COURSE GUIDELINES & EXPECTATIONS

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### Academic Integrity

Academic dishonesty is NOT tolerated and the consequences can be severe.

Possible disciplinary actions include:

- \* You receive zero on the test
- \* An Academic Infraction Report is added to your academic record.

## SCHOOL OR DEPARTMENTAL INFORMATION

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Free math help is available in the MATH LAB in TEC 142.

## STUDENT RESPONSIBILITY

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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

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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 <http://camosun.ca/students/>.

Academic Advising	<a href="http://camosun.ca/advising">http://camosun.ca/advising</a>
Accessible Learning	<a href="http://camosun.ca/accessible-learning">http://camosun.ca/accessible-learning</a>
Counselling	<a href="http://camosun.ca/counselling">http://camosun.ca/counselling</a>
Career Services	<a href="http://camosun.ca/coop">http://camosun.ca/coop</a>
Financial Aid and Awards	<a href="http://camosun.ca/financialaid">http://camosun.ca/financialaid</a>
Help Centres (Math/English/Science)	<a href="http://camosun.ca/help-centres">http://camosun.ca/help-centres</a>
Indigenous Student Support	<a href="http://camosun.ca/indigenous">http://camosun.ca/indigenous</a>
International Student Support	<a href="http://camosun.ca/international/">http://camosun.ca/international/</a>
Learning Skills	<a href="http://camosun.ca/learningskills">http://camosun.ca/learningskills</a>
Library	<a href="http://camosun.ca/services/library/">http://camosun.ca/services/library/</a>
Office of Student Support	<a href="http://camosun.ca/oss">http://camosun.ca/oss</a>
Ombudsperson	<a href="http://camosun.ca/ombuds">http://camosun.ca/ombuds</a>
Registration	<a href="http://camosun.ca/registration">http://camosun.ca/registration</a>
Technology Support	<a href="http://camosun.ca/its">http://camosun.ca/its</a>
Writing Centre	<a href="http://camosun.ca/writing-centre">http://camosun.ca/writing-centre</a>

**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 Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the [Centre for Accessible Learning](#) (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started:

<http://camosun.ca/services/accessible-learning/>

### Academic Integrity

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf> for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

### Academic Progress

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/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 <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <http://camosun.ca/learn/fees/#deadlines>.

### Grading Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf> for further details about grading.

### Grade Review and Appeals

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

### Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the "Attendance" section under "Registration Policies and Procedures" (<http://camosun.ca/learn/calendar/current/procedures.html>) and the Grading Policy at <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf>.

### 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. Please visit

<http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf> to learn more about the process involved in a medical/compassionate withdrawal.

### Sexual Violence and Misconduct

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 or misconduct 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 and Misconduct Policy: <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf> and [camosun.ca/sexual-violence](http://camosun.ca/sexual-violence). To contact the Office of Student Support: [oss@camosun.ca](mailto:oss@camosun.ca) or by phone: 250-370-3046 or 250-3703841

### 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 <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

**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.

## Math 191-X01 Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
Sept 6-10	<b>Holiday</b>	23.1	23.1	23.1	23.2
Sept 13-17	23.3	23.3	23.5	23.4/23.9	23.6
Sept 20-24	23.7	23.7	23.8	23.8	24.1
Sept 27-Oct 1	24.2	24.3	24.3	<b>Holiday</b>	<b>Test</b>
Oct 4-8	24.4	24.4	24.5	24.5	24.7
Oct 11-15	<b>Holiday</b>	24.7	24.8	24.8	24.8
Oct 18-22	27.1	27.1	27.2	27.3	27.3
Oct 25-29	27.5	27.5	27.6	27.8	<b>Test</b>
Nov 1-5	25.1	25.2	25.2	25.2	25.3
Nov 8-12	25.4	25.5	25.6	<b>Holiday</b>	26.1
Nov 15-19	26.2	26.2	26.3	26.3	26.4
Nov 22-26	26.4	26.6	26.6	16.1	<b>Test</b>
Nov 29-Dec 3	16.2	16.2	16.3	16.3	16.4
Dec 6-10	16.5	16.5	16.5	Review	Review

Weekly quiz at the beginning of class on Tuesdays, starting in Week 2.

### Tentative Test Coverage

Test 1: All of Ch 23

Test 2: All of Ch 24, 27.1, 27.2

Test 3: 27.3, 27.5, 27.6, 25.1-25.6, 26.1, 26.2