

# COURSE SYLLABUS



COURSE TITLE: MATH-252: Applied Differential Equations

CLASS SECTION: X02

TERM: Winter 2023

COURSE CREDITS: 3

DELIVERY METHOD(S): In-person Lecture

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

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

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For COVID-19 information please visit <https://camosun.ca/about/covid-19-updates>

*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: Patricia (Pat) Wrean

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

OFFICE: CBA 153

HOURS: Tues, Wed, Thurs: 1:30 to 2:20 pm, Fri: 12:30 to 1:20 pm

*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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This first course in differential equations includes solving and modeling with first-order differential equations, solving and modeling with linear differential equations of higher order including applications such as spring-mass systems, finding series solutions of linear differential equations, using Laplace transforms to solve linear initial value problems, and solving systems of linear differential equations. Applications to engineering are provided throughout the course.

### PREREQUISITE(S):

Restricted to students in Engineering Bridge

All of:

- C in MATH 250A
- C in MATH 251

### CO-REQUISITE(S):

Not Applicable

## EXCLUSION(S):

Not Applicable

## COURSE LEARNING OUTCOMES / OBJECTIVES

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Upon completion of this course students will be able to:

1. Solve various types of first-order differential equations (DEs): separable, linear, exact, nth-degree homogeneous, and Bernoulli.
2. Solve higher-order linear DEs using a variety of techniques including reduction of order, variation of parameters, and undetermined coefficients.
3. Model real-life phenomenon with DEs, including exponential growth and decay, falling bodies with and without air resistance, LCR circuits, and mass-spring systems.
4. Find a power series solution for a linear DE.
5. Use a Laplace transform and its properties to solve a linear IVP.
6. Solve systems of linear DEs using matrices.

## REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

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Calculator - Only ordinary scientific calculators (non-graphing, non-programmable) are permitted. The use of other electronic devices such as cell phones, MP3 players, iPods, electronic translators, etc., during exams is not allowed. During exams, you cannot share calculators between students.

The course website is at <http://wrean.ca/math251/>

A set of practice exercises and answers will be available on D2L.

Optional Text: Dennis G. Zill, A First Course in Differential Equations with Modeling Applications, 11th Edition, Metric Version, Brooks/Cole, 2018. Previous editions or non-metric versions are also acceptable. Students interested in alternate Open Educational Resources textbooks should check the course website at <http://wrean.ca/math252> for options.

## 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.

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
Week 1	Chapter 1. Introduction to Differential Equations	
Weeks 1 to 3	Chapter 2. First-Order Differential Equations	
Weeks 3 to 4	Chapter 3. Modeling with First-Order Differential Equations	
Weeks 4 to 7	Chapter 4. Higher-Order Differential Equations	
Week 8	Chapter 5. Modeling with Higher-Order Differential Equations	
Weeks 9 to 10	Chapter 6. Series Solutions of Linear Equations	
Weeks 10 to 12	Chapter 7. Laplace Transforms	
Weeks 13 to 14	Chapter 8. Systems of Linear First-Order Differential Equations	

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
Test 1	18%
Test 2	18%
Test 3	18%
Online WeBWork Assignments	6%
Final Exam	40%
<b>TOTAL</b>	<b>100%</b>

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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**Tests:** There will be three term tests. The first time a student misses a test for any reason, the weight of the missed test will be transferred to the final exam. No documentation is required for the first absence. Further absences will be treated on a case-by-case basis. The tentative test dates may be found at [http://wrean.ca/math252/math252\\_tests.htm](http://wrean.ca/math252/math252_tests.htm).

**Assignments:** The assignments are online. The lowest assignment grade will be dropped when calculating the average of your assignments. This allows a student to miss one assignment for any reason, including illness, without penalty. Each student can also ask for a week's extension on one assignment for any reason, no questions asked. ***In order to get a full understanding of the course materials, the online assignments will not be enough. Please also work through the practice materials.***

**Collaboration:** Students are encouraged to collaborate (work together) on assignments and to consult the Math Lab tutor and/or the instructor when stuck. However, you must be prepared to answer similar questions on your own for the tests and final exam, so it is vital that you yourself understand all of the assigned questions and work that you turn in.

**Final Exam:** The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar, "students are expected to write tests and final examinations at the scheduled time" Exceptions will only be considered due to emergency circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.

**Academic Integrity:** 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. The course website has a link to the handout on the About page. It is your responsibility to become familiar with the contents of the document and the college policies it references.

## SCHOOL OR DEPARTMENTAL INFORMATION

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Interurban Math Lab (TEC 142)

Services: Individual free tutoring and study space

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

## 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.

## COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

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### 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](http://camosun.ca/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.