

# COURSE SYLLABUS



COURSE TITLE: ECET 281 System Dynamics

CLASS SECTION: X01/X02

TERM: 2022F

COURSE CREDITS: 3

DELIVERY METHOD: In person

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](#).

The COVID-19 pandemic has presented many challenges, and Camosun College is committed to helping you safely complete your education. Following guidelines from the Provincial Health Officer, WorkSafe BC, and the B.C. Government to ensure the health and wellbeing of students and employees, Camosun College is providing you with every possible protection to keep you safe. Our measures include COVID Training for students and employees, health checks, infection control protocols including sanitization of spaces, PPE and ensuring physical distancing. For details on these precautions please follow this link: <http://camosun.ca/covid19/faq/covid-fags-students.html>. However, if you're at all uncomfortable being on campus, please share your concerns with your Instructor. If needed, alternatives will be discussed.

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*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: Joyce van de Vegte

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

OFFICE: TEC 208

*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 techniques of signal and system analysis. They will learn differential equations for circuit analysis, Laplace transforms for system analysis, transfer functions, Fourier series analysis of periodic sources, and Fourier transforms for the study of signal spectra and system frequency responses.

PREREQUISITE(S): C in MATH 168

## COURSE LEARNING OUTCOMES / OBJECTIVES

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

- analyze first order circuits using differential equations;
- determine circuit transfer functions using Laplace transforms;
- calculate voltages and currents in a circuit using Laplace transforms;
- predict steady state behaviour for circuits with sinusoidal sources using phasors;
- compute voltages and currents for circuits with periodic sources using Fourier series;
- analyze the frequency content of a periodic signal using the Fourier series;
- analyze the frequency content of a non-periodic signal using the Fourier transform;
- determine the frequency response of a system.

## REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Class notes and resources will be available on D2L.

Optional Text: Transform Circuit Analysis for Engineering and Technology  
(William D. Stanley)

## 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.

HOURS	ACTIVITY or TOPIC	OTHER NOTES
1	1. Systems 1.1 Block diagrams 1.2 Linear stationary systems	
2.5	2. Signals 2.1 Step, impulse and ramp functions 2.2 Time-shifted functions 2.3 Sinusoidal functions 2.4 Exponential functions 2.5 Shifted, delayed functions 2.6 Piecewise linear functions	Extra practice: Chapter 2: 3, 9, 21, 23, 27, 43, 53, 55, 61, 67 Chapter 3: 61, 63
5	3. Continuous time linear differential equations 3.1 Initial conditions for capacitors and inductors 3.2 Transient response 3.3 Steady state response 3.4 Complete circuit response 3.5 First and second order circuit examples	Extra practice: Chapter 4: 11, 13, 15, 17, 19, 21, 23, 29, 35, 37
4	4. Laplace transforms 4.1 Laplace transforms and inverse Laplace transforms 4.2 Laplace transform table 4.3 Properties of Laplace transforms 4.4 Inverse Laplace transforms	Extra practice: Chapter 5: 1 – 47 odd

HOURS	ACTIVITY or TOPIC	OTHER NOTES
4.5	5. Circuit analysis by Laplace transform 5.1 Transformation of circuit differential equation 5.2 Circuit transformation with zero initial conditions 5.3 Modelling non-zero initial conditions 5.4 First and second order examples 5.5 Predicting circuit response	Extra practice: Chapter 6: 13, 15, 17, 19, 21, 23, 25, 29, 35, 37, 43, 49, 51
6	6. Transfer functions 6.1 Impulse response and convolution 6.2 Definition of transfer function 6.3 Computation of circuit transfer functions 6.4 Frequency response 6.5 Poles, zeros and stability	Extra practice: Chapter 7: 1, 3, 5, 21
2	7. Steady state AC analysis 7.1 Phasors 7.2 Impedance vectors 7.3 Circuit analysis for sinusoidal sources using phasors	Extra practice: Chapter 8: 1, 3
5	8. Fourier series 8.1 Fourier series definition 8.2 Periodic sources 8.3 Analysis of circuits with periodic sources using phasors 8.4 Amplitude and phase spectra for periodic signals 8.5 Parseval's theorem	Extra practice: Chapter 9: 1, 3, 5, 7
5	9. Fourier transforms 9.1 Definition 9.2 Relationship to Fourier series and Laplace transform 9.3 Frequency response for systems 9.4 Amplitude and phase spectra for non-periodic signals 9.5 Sampling theory 9.6 Relationship with fast Fourier transform (FFT)	Extra practice: Chapter 9: 11
7	Tests and Review	

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
Online assignments	20%
Tests (2) Test 1 (week 5): Friday 7 October 2022 Test 2 (week 11): Friday 18 November 2022	40%
Final exam (3 hours) 12-20 December 2022 To pass the course, students must obtain a minimum of 50% on the final exam.	40%
	<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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Problem sets will be assigned (but not handed in) and solution sets will be posted. Short online assignments will be completed throughout the course.

## SCHOOL OR DEPARTMENTAL INFORMATION

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Electronics & Computer Engineering Technology  
Chair: Alan Duncan

## 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/>.

Support Service	Website
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>

Support Service	Website
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](#) (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.