

COURSE SYLLABUS



COURSE TITLE: ECET 248 – Electronics for Mechanical
CLASS SECTION: X0n
TERM: Winter 2024
COURSE CREDITS: 3
DELIVERY METHOD(S): 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](#).

For COVID-19 updates 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

NAME: Lindsay Stretch
EMAIL: stretch@camosun.ca
OFFICE: TEC 269
HOURS: 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 study signal conditioning fundamentals and instrumentation as well as circuits for controlling electrical power. Students will learn how to configure amplifiers for use with a variety of sensors including strain gauges, photodiodes, switches, thermistors, thermocouples, etc. Students will learn how to apply power control devices and develop skills such as soldering and terminal crimping.

PREREQUISITE(S): see calendar
CO-REQUISITE(S): see calendar
EQUIVALENCIES: see calendar

COURSE LEARNING OUTCOMES / OBJECTIVES

Through lecture, reading material and lab experiments the student will be introduced to electronics concepts and active components related to instrumentation, signal conditioning and power generation and control as well as component and wire interconnection methods. Emphasis is on practical application of each topic.

Evaluation will be based on the competency demonstrated by the student.

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

- Describe analog signal characteristics
- Calculate amplifier requirements for a signal and load
- Select appropriate components for passive and active filters
- Design and construct BJT and MOSFET signal amplifiers
- Design and construct standard operational amplifier (opamp) circuits
- Interface transducer signals to a microcontroller
- Utilize relays or contactors to switch large electrical loads
- Use a variety of solid-state devices and techniques to control DC loads
- Calculate thermal characteristics of power devices
- Reliably connect wires, components and connectors using solder and crimping

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

- Access to a PC, online resources.
- Course materials from D2L site
- Principles of Electronics (Multicolour) Mehta, Rohit – ebook about \$30 at Amazon.ca
https://www.amazon.ca/Principles-Electronics-Multicolour-Mehta-Rohit-ebook/dp/B06XKV3RPX/ref=sr_1_1
- Text (Recommended in pdf if available):
Circuit Analysis with Devices: Theory and Practice
Robins and Miller ISBN 1-4018-7984-5
- Other (Optional)
 - o Foundations of Electronics, Circuits and Devices 3rd Edition
Russell L. Meade ISBN 0-7668-0427-5
 - o Introduction to Electric Circuit, 9th Edition
Herbert W Jackson ISBN 9-780195-438130

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

1.	Introduction	2 hours
1.1	Course introduction	
1.2	Circuit analysis review	
2.	Instrumentation and Signal Conditioning	10 hours
2.1	Analog vs digital signals	
2.2	Gain and signal to noise ratio	
2.3	Passive filters review (RC, LC)	
2.4	BJT amplifier	
2.5	MOSFET amplifier	
2.6	Intro to operational amplifier (opamp)	
2.7	Basic opamp circuits	
2.8	Active filters	
2.9	Differential amplifier	
2.10	Instrumentation amplifier	
2.11	Sensors and transducers	
2.12	Microcontroller interfacing	
3.	Electrical power control	10 hours
3.1	Introduction and basic concepts	
3.2	Power diodes/rectifiers	
3.3	Relays and contactors	
3.4	Solid state power devices	
3.5	Pulse width modulation	
3.6	Snubbers	
3.7	Chopper circuits and drives	
3.7.1	DC-DC converters	
3.7.2	Inverters	
3.7.3	Bridge circuits	
3.8	DC motor control	
3.8	Thermal considerations	
4.	Component and wire interconnection	4 hours
4.1	Soldering	
4.2	Crimping	
4.3	Wire wrap	
5.	Tests and review	2 hours
Total		28 hours

Lab Topics (Subject to change)

- 1 Intro to Multisim
- 2 Intro to Lab and Equipment
- 3 BJT Amplifier
- 4 FET Amplifier
- 5 Basic Opamp Circuits
- 6 Opamp Applications
- 7 Strain Gauge/Instrumentation Amp
- 8 Window Comparator
- 9 Phase Control
- 10 DC-DC Motor Control
- 11-13 Soldering/Crimping

Note: Lab attendance is mandatory and all reports must be submitted within one week after scheduled lab time unless special arrangements are made with the instructor.

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

DESCRIPTION	WEIGHTING
Assignments	20%
Labs (all labs/reports must be completed to pass this course)	20%
Midterm(s)	20%
Final Exam (must pass final exam to pass this course)	30%
Attendance/Participation/Quizzes	10%
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](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>

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.

COURSE GUIDELINES & EXPECTATIONS

IN THE LAB – Students are responsible for sanitizing their workspace prior to AND after the class. Lab cleanup begins **15 minutes before the end of the class**. Cleaning provisions will be supplied by Camosun where necessary.

A portion of your mark will be based on your respect for the college equipment, the cleanliness of your workstation, your participation in the cleaning crew and the cleanliness of the floor around your work station.

Attendance is mandatory for all classroom/lab activities. It is the student’s responsibility to inform the instructor prior to being late or missing a class, or as soon as possible. Arriving late to class will result in a 20% demerit for any work graded that day.

Professionalism: “the skill, good judgment, and polite behavior that is expected from a person who is trained to do a job well” (Merriam Webster online). Students will be evaluated on the above as well as their ability to work well in a team.

Assignments and/or Quizzes are based on the lecture topics and hands on lab exercises.

SCHOOL OR DEPARTMENTAL INFORMATION

1. A grade of 60% or more is required in all assessment items above to pass the course or to use this course to qualify as a prerequisite.
2. No late materials will be accepted past midnight of the last day of the course.
3. No opportunity will be available to write missed quizzes.
4. All late course material is reduced in mark by 50% and then an additional 10% per day

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

Support Service	Website
Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills

Support Service	Website
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

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 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. To contact the Office of Student Support: 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.