



CAMOSUN COLLEGE
Trades and Technology
Electronics and Computer Engineering

ECET248
Electronics for Mechanical

Winter 2023

COURSE OUTLINE

The calendar description is available on the web @ <http://calendar.camosun.ca...#ECET248>

Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

(a) Instructor	lecture	Lindsay Stretch
(b) Office hours	TBD	
(c) Location	TEC269	
(d) Phone	250-370-4650	Alternative: _____
(e) E-mail	stretch@camosun.ca	
(f) Website	https://idp.camosun.ca	

Pre-requisites

- Successful completion of ECET 149: Electricity and Machines

Course Hours Lecture: 2hrs/wk Lab: 2hrs/wk Duration: 14 weeks

2. Intended Learning Outcomes

The course will focus on aspects of signal conditioning and instrumentation as well as controlling electrical power output. Topics covered are: electrical and electronic basics; introduction to instrumentation amplifiers; use of a variety of sensors including strain gauges, photodiodes, switches, thermistors, thermocouples, etc.; power control devices; and, the development of skills such as soldering and terminal crimping.

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

3. Required Materials

(a) Course materials from D2L site

(b) Principles of Electronics (Multicolour) Mehta, Rohit – ebook \$30 at Amazon.ca
https://www.amazon.ca/Principles-Electronics-Multicolour-Mehta-Rohit-ebook/dp/B06XKV3RPX/ref=sr_1_1

(c) Text (Recommended in pdf if available):
Circuit Analysis with Devices: Theory and Practice
Robins and Miller ISBN 1-4018-7984-5

(d) Other (Optional)
Foundations of Electronics, Circuits and Devices 3rd Edition
Russell L. Meade ISBN 0-7668-0427-5

Introduction to Electric Circuit, 9th Edition
Herbert W Jackson ISBN 9-780195-438130

Access to a PC, online resources.

4. Course Content and Schedule (Subject to change)

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	
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
11-12	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.

5. Basis of Student Assessment (Weighting)

Assignments:	20%
Exams:	Mid-term(s): 20%
	Final: 30% (must pass final exam to pass this course)
Labs:	20% (all labs/reports must be completed to pass this course)
Attendance/Participation	10%

6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Student Services or the College web site at <http://www.camosun.bc.ca>

STUDENT CONDUCT POLICY

There is a Student Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.

<http://www.camosun.bc.ca/policies/policies.html>

A. GRADING SYSTEMS <http://www.camosun.bc.ca/policies/policies.php>

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at <http://www.camosun.bc.ca/policies/E-1.5.pdf> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.