



**CAMOSUN COLLEGE**  
**Trades and Technology**  
**Electronics and Computer Engineering**

**ECET248**  
**Electronics for Mechanical**

**Fall 2019**

**COURSE OUTLINE**

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**The calendar description is available on the web @**

<http://camosun.ca/learn/calendar/current/web/ecet.html#ECET248>

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*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.*

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**1. Instructor Information**

<b>(a) Instructor</b>	<b>lecture</b>	Lindsay Stretch
	<b>lab</b>	Lindsay Stretch
<b>(b) Office hours</b>	TBD	
<b>(c) Location</b>	TEC216	
<b>(d) Phone</b>	250-370-4650	<b>Alternative:</b>
<b>(e) E-mail</b>	stretch@camosun.ca	
<b>(f) Website</b>		

**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 \$35 at Amazon.ca  
[https://www.amazon.ca/Principles-Electronics-Multicolour-Mehta-Rohit-ebook/dp/B06XKV3RPX/ref=sr\\_1\\_1](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)

<b>1. Introduction</b>	<b>2 hours</b>
1.1 Course introduction	
1.2 Circuit analysis review	
<b>2. Instrumentation and Signal Conditioning</b>	<b>10 hours</b>
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	
<b>3. Electrical power control</b>	<b>10 hours</b>
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	
<b>4. Component and wire interconnection</b>	<b>4 hours</b>
4.1 Soldering	
4.2 Crimping	
4.3 Wire wrap	
Tests and review	2 hours
<b>Total</b>	<b>28 hours</b>

## Lab Topics (Subject to change)

- 1 Intro to Lab and Equipment
- 2 BJT Amplifier
- 3 FET Amplifier
- 4 Basic Opamp Circuits
- 5 Opamp Applications
- 6 Strain Gauge/Instrumentation Amp
- 7 Window Comparator
- 8 Pulse Width Modulation
- 9 Phase Control
- 10 DC-DC Motor Control
- 11-12 Soldering/Crimping

## 5. Basis of Student Assessment (Weighting)

Assignments: 20%

Exams: Mid-term: 30%  
Final: 30%

Labs: 20%

## 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.