CAMOSUN COLLEGE
Trades and Technology
Electronics and Computer Engineering

ELEX 146
AC Circuit Analysis and Devices

Winter 2019

COURSE OUTLINE

The calendar description is available on the web @ _____

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

(a) Instructor	Phil Vreugdenhil		
(b) Office hours	TBA		
(c) Location	CBA122a		
(d) Phone	250-370-3001	**Alternative:**	
(e) E-mail	VreugdenhilP@camosun.bc.ca		
(f) Website	www.camosun.bc.ca		

Course Hours Lecture: 2hrs/wk Lab: 3hrs/wk Duration: 14 weeks

Office Hours: Thurs @11:30am – 1:00pm, Friday @ 8:30am – 9:30am

NOTE: There are no classes during "Reading Week" → Feb. 18th – 22nd

2. Intended Learning Outcomes

This course will cover the fundamentals of AC electronic circuits and evaluate a number of circuits containing both passive and active devices. Topics include the AC analysis of passive components such as resistors, capacitors and inductors, series and parallel AC circuits, network theorems, instrumentation and troubleshooting. Complex numbers and phasor diagrams are used to explain the operation of AC circuits. Semiconductor devices such as diodes, transistors, FETs, op amps, and comparators are further analyzed from an AC perspective.

3. Required Materials

(a) There is no required text for this course. All the information is available online

(b) Access to Camosun D2L online course materials as required

4. Course Content

1. Introduction to Alternating Current
   - 1.1 Sine Wave Generation and Phase Relationships
   - 1.2 Period, Frequency and Phasor Representations of Sine Waves
   - 1.3 Purely Resistive AC Circuits
   - 1.4 Peak, Average, and Effective (RMS) Value of a Sine Wave
   - 1.5 Other Types of Periodic Waveforms (4 hours)

2. Capacitance in AC Circuits
   - 2.1 Capacitive Reactance
   - 2.2 Analysis of Series RC Circuits
   - 2.3 Analysis of Parallel RC Circuits
   - 2.4 Power In A Capacitive Circuit (4 hours)

3. AC Amplifiers
   - 3.1 Amplifier classes characteristics
   - 3.2 Common emitter BJT amplifier
   - 3.2 Common source MOSFET amplifier
   - 3.3 Op Amp amplifier circuits (4 hours)

4. Inductance in AC Circuits
   - 4.1 Inductive Reactance
   - 4.2 Analysis of Series RL Circuits
   - 4.3 Analysis of Parallel RL Circuits
   - 4.4 Power In an Inductive Circuit (4 hours)

5. Non Resonant AC Circuits
   - 5.1 Analysis of Series RLC Circuits
   - 5.2 Analysis of Parallel RLC Circuits
   - 5.3 Power In an RLC Circuit (3 hours)

6. Resonant AC Circuits
   - 6.1 Series Resonance
   - 6.2 Quality Factor & Selectivity in a Series Resonant Circuit
   - 6.3 Parallel Resonance
   - 6.4 Quality Factor & Selectivity in a Parallel Resonant Circuit (5 hours)

7. Transformers
   - 7.1 Theory of Operation - Mutual Inductance
   - 7.2 Iron, Air, and Ferrite Core Transformers
   - 7.3 Voltage and Current Ratios
   - 7.4 Transformer Losses (3 hours)

Power supplies

8.1	DC power supply overview	
8.2	Rectifier Circuits	
8.3	Capacitive input filter	
8.4	Zener voltage regulator	
8.5	Series pass transistor	
8.6	Heat sinking	
8.7	Three terminal regulators	
8.8	Switching regulator overview	(6 hours)

8. Thyristors devices and Circuits

9.1	SCR Characteristics	
9.2	DIAC Characteristics	
9.3	TRIAC Characteristics	(3 hours)

9. Oscillators

10.1	RC oscillators	
10.2	Crystal controlled oscillators	
10.3	555 Timer	(3 hours)

Total In-Class Theory Hours	(40 hours)
Mid-term Exam	(2 Hours)

5. Basis of Student Assessment (Weighting)

Quizzes (13):	14%	→ 1.08% each
Labs (13):	26%	→ 2% each
Term Test (1):	30%	→ Monday, March 13th??
Final Exam:	30%	→ TBA
Total Course Mark	100%	

- Quizzes must be completed before the following week's classes begin.
- Lab reports are to be submitted to D2L within a week of the assigned lab period. Students must complete and submit all lab reports by the end of the semester.
- Students must obtain a minimum of 50% on the final exam to pass the course.
- Absence from any quiz, term test, or final exam will result in a grade of zero (0%) for that assessment unless an official note (i.e. – doctor) is produced.
- Late Quizzes get 0%. Late Labs get discounted at instructor's discretion.

6. Grading System

[X] 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	*Incomplete*: 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	*In progress*: 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	*Compulsory Withdrawal*: 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.