COURSE SYLLABUS

CAMOSUN COLLEGE

COURSE TITLE: ECET 250E- Linear Circuits-1

CLASS SECTION:

TERM: 2024 Fall

COURSE CREDITS:4

DELIVERY METHOD(S): Lecture

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-faqs-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.

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: **Dr. Mozhgan Bacon**

EMAIL: **Baconm@camosun.ca**

OFFICE: TEC 216

LECTURE HOURS: 4hrs /week

LAB HOURS: 2.5hrs /week

OFFICE HOURS: 2hrs /week

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

Public holidays:

(Week 1)	Sep 2nd Monday	labour day
(Week 5)	Sep 30th Monday	National Day for Truth and Reconciliation
(Week 7)	Oct 14th Monday	Thanksgiving Day
(Week 11)	Nov 11th Monday	Remembrance Day

Exam dates:

Exam Type	Exam Date and Time	Syllabus
Quiz-1	19th September 2024, (Week 3)	Chapter 1, 2
Midterm	8th and 10th October 2024, (Week 6)	Chapter 1, 2, 3, 4, 6
Quiz-2	31st October 2024, (Week 9)	Chapter 7,8,9
Quiz-3	21st November 2024, (Week 12)	Chapter 10,11,5
Final Exam	As per college date	Chapter 1,2,3,4,5,6,7,8,9,10,11

PREREQUISITE(S):   Restricted to students taking the Engineering Bridge Program
CO-REQUISITE(S):   None
EXCLUSION(S):   None

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course the student will be able to:

At the end of the course, student should be able to demonstrate knowledge of basic electronic circuit theory, linear circuit analysis techniques, operational amplifiers, three phase systems and transformers.

Students should be able to apply the theory to laboratory hands on exercises.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

a. Alexander and Sadiku: Fundamentals of Electric Circuits 5th / 6th edition, McGraw-Hill
   FREE TEXT: http://www.allaboutcircuits.com/
b. Laboratory documents, course notes and practice problems (Available on D2L)

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

Course outline:

INTRODUCTION and OBJECTIVE of the course
> Electronic system model. Linear vs non-linear systems. Lab equipment Charge and current, voltage, energy, and power. Passive and active elements.

COURSE CONTENT

1. **BASIC CONCEPTS** (CHAPTER 1-PAGE 3)
   1.1. Charge and Current 6
   1.2. Voltage 9
   1.3. Energy and Power 10
   1.4. Passive and Active Elements 14

2. **BASIC LAWS (RESISTIVE CIRCUITS)** (CHAPTER 2-PAGE 29)
   2.1. Ohm's law 30
   2.2. Kirchhoff's laws 37
   2.3. Series and Parallel Resistive Circuits 43-44

Labs (Subject to change):

Lab 1. Introduction to lab Equipment
Lab 2. Breadboard
Lab 3. Introduction to Multisim
Lab 4. Resistive DC Circuits
Lab 5. Kirchhoff's Law and Voltage Divider
Lab 6. No Formal Lab (**Midterm Oct 8&10/2024**) **(Week 6)**
Lab 7. Thevenin's Theorem and Maximum Power Transfer
Lab 8. First Order Transient Circuits AC Resistive and Resistive-Capacitive (RC) Circuits
Lab 9. First Order Transient Circuits AC Resistive and Resistive-Inductive (RL) Circuits
Lab 10. Second Order Circuits RLC
Lab 11. AC Measurements
Lab 12. AC Measurements in an RC circuit
Lab 13. POWER in AC
Lab 14. Simple Op-Amp Circuits

EVALUATION OF LEARNING

Problem Sets	5%
Quizzes	15%
Mid-Term	25%
Final Exam	35%
Total theory	**80%**
Laboratory Evaluation	20%
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 policy for more information.
http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf

Lesson Plan:

The following schedule and course components are *subject to change*, as deemed appropriate by the instructor.

Week	Day	Date	Time	Lecture	Subject	Problem Set/Due Date	Quiz & Tests
Week 1	Mon.	September 2, 2024	14:30:00	(1) ---	**BASIC Concepts** **(CHAPTER 1)** **PAGE 3**	**Problemset 1-Chapter 1**	
	Tues.	September 3, 2024	11:30:00	(2) Lecture 1: Charge and Current, Voltage **6**			
	Wed.	September 4, 2024	11:30:00	(3) Lecture 2: Energy and Power **10**			
	Thurs.	September 5, 2024	13:30:00	(4) Lecture 3: Passive and Active Elements **14**			
	Thurs,Thus-Lab	Sep 3,5 ,2024	15:00:00	**Lab 1**: Introduction to Lab equipment		Mon. Sep 9, 2024 14:30	
Week 2	Mon.	September 9, 2024	14:30:00	(1) Lecture 1: Ohm's law **30**	**BASIC LAWS (RESISTIVE CIRCUITS)** **(CHAPTER 2)** **PAGE 30**	**Problemset 2-Chapter 2**	
	Tues.	September 10, 2024	11:30:00	(2) Lecture 2: Kirchhoff's laws **37**			
	Wed.	September 11, 2024	11:30:00	(3) Lecture 3: Series Resistive Circuits **43**			
	Thurs.	September 12, 2024	13:30:00	(4) Lecture 4: Parallel Resistive Circuits **44**			
	Thurs,Thus-Lab	Sep 10,12, 2024 1500	15:00:00	**Lab 2**: Breadboard		Mon. Sep 16 , 2024 14:30	
Week 3	Mon.	September 16, 2024	14:30:00	(1) Lecture 1: Nodal Analysis of Resistive Circuits **80**	**METHODS OF ANALYSIS AND CIRCUIT THEOREM** **(CHAPTER 3)** **PAGE 79**	**Problemset 3-Chapter 3**	**Quiz 1** **Chapter1-2** Thursday Sep 19, 2024 13:30
	Tues.	September 17, 2024	11:30:00	(2) Lecture 2: Mesh Analysis of Resistive Circuits **91**			
	Wed.	September 18, 2024	11:30:00	(3) Lecture 3: Nodal and Mesh Analysis of Resistive Circuits (Cont.)			
	Thurs.	September 19, 2024	13:30:00	(4) Lecture 4: **Quiz 1**			
	Thurs,Thus-Lab	Sep 17,19, 2024 15:00	15:00:00	**Lab 3**: Introduction MultiSim		Mon. Sep 23, 2024 14:30	
Week 4	Mon.	September 23, 2024	14:30:00	(1) Lecture 1: Superposition **129**	**CIRCUIT THEOREMS** **(CHAPTER 4)** **PAGE 125**	**Problemset 4-Chapter 4**	
	Tues.	September 24, 2024	11:30:00	(2) Lecture 2: Thevenin's Theorem **137**			
	Wed.	September 25, 2024	11:30:00	(3) Lecture 3&4: Norton's Theorem **143-**			
	Thurs.	September 26, 2024	13:30:00	(4) Lecture 4: Maximum Power Transfer **148**			
	Thurs,Thus-Lab	Sep 24,26, 2024 15:00	15:00:00	**Lab 4**: Practice		Tues. Oct 1, 2024 11:30	
Week 5	Mon.	September 30, 2024	14:30:00	(1) Lecture 1: Holiday	**CAPACITORS AND INDUCTORS (ENERGY-STORAGE ELEMENTS)** **(CHAPTER 6)** **PAGE 213**	**Problemset 5-Chapter 6**	
	Tues.	October 1, 2024	11:30:00	(2) Lecture1& 2: Capacitors **214** - Series and Parallel Capacitors **220**			
	Wed.	October 2, 2024	11:30:00	(3) Lecture 3: Inductors **224**			
	Thurs.	October 3, 2024	13:30:00	(4) Lecture 4: Series and Parallel Inductors **228**			
	Thurs,Thus-Lab	Oct 1,3, 2024 15:00	15:00:00	**Lab 5**: Resistive DC Circuits (Kirchhoff's law and Voltage Divider)		Mon. Oct 7, 2024 14:30	
Week 6	Mon.	October 7, 2024	14:30:00	(1) Lecture 1: Source-free RC **253**	**FIRST ORDER CIRCUITS (SIMPLE RC AND RL CIRCUITS)** **(CHAPTER 7)** **PAGE 251**	**Problemset 6-Chapter 7**	**Midterm** **Chapter 1-2-3-4-6-** Oct 8,10, 2024 **Lab Time Slot**
	Tues.	October 8, 2024	11:30:00	(2) Lecture 2: Source-free RC and RL Circuits **257**			
	Wed.	October 9, 2024	11:30:00	(3) Lecture 3: Step Response of an RC Circuit **271**			
	Thurs.	October 10, 2024	13:30:00	(4) Lecture 4: Step Response of an RL Circuit **278**			
	Thurs,Thus-Lab	Oct 8,10, 2024 15:00	15:00:00	**Lab 6: Midterm Oct 8&10, 2024**		Tues. Oct 15, 2024 11:30	
Week 7	Mon.	October 14, 2024	14:30:00	(1) Lecture 1: Holiday	**Second-Order Circuits** **(CHAPTER 8)** **PAGE 311**	**Problemset 7-Chapter 8**	
	Tues.	October 15, 2024	11:30:00	(2) Lecture 2: Intro to Second Order Circuits-Source-free Series RLC Circuits **312-317**			
	Wed.	October 16, 2024	11:30:00	(3) Lecture 3: Source-free Parallel RLC Circuits **324**			
	Thurs.	October 17, 2024	13:30:00	(4) Lecture 4: Source-free Parallel RLC Circuits **324** (Cont.)			
	Thurs,Thus-Lab	Oct 15,17, 2024 15:00	15:00:00	**Lab 7**: Thevenin Theorem and Maximum Power Transfer		Mon. Oct 21, 2024 14:30	
Week 8	Mon.	October 21, 2024	14:30:00	(1) Lecture 1: Properties of sinusoids **368**-Phasors **374**	**Second-Order Circuits** **Sinusoids and Phasors** **(CHAPTER 9)**	**Problemset 8-Chapter 9**	
	Tues.	October 22, 2024	11:30:00	(2) Lecture 2: Impedance and Admittance **385**			
	Wed.	October 23, 2024	11:30:00	(3) Lecture 3: Kirchhoff's Laws in Frequency Domain **387**			

	Thurs.	October 24, 2024	13:30:00	(4) Lecture 4: Impedance Combinations **388**	**PAGE 367**		
	Thurs,Thus-Lab	Oct 22,24, 2024 15:00	15:00:00	**Lab 8**: First Order Transient Circuits AC Resistive and RC/ RL Circuits		Mon. Oct 28, 2024 14:30	
Week 9	Mon.	October 28, 2024	14:30:00	(1) Lecture 1: Nodal and Mesh Analysis **412-415**	**sinusiodal (ac) SteadyState Analysis** **(CHAPTER 10)** **PAGE 411**	**Problemset 9-Chapter 10**	**Quiz 2** **Chapter 7-8- 9** Thursday Oct31, 2024 13:30
	Tues.	October 29, 2024	11:30:00	(2) Lecture 2: Superposition Theorem **419**			
	Wed.	October 30, 2024	11:30:00	(3) Lecture 3: Thevenin and Norton Theorems **424**			
	Thurs.	October 31, 2024	13:30:00	(4) Lecture 4: **Quiz 2**			
	Thurs,Thus-Lab	Oct 29,31, 2024 15:00	15:00:00	**Lab 9**: Practice		Mon. Nov 4, 2024 14:30	
Week 10	Mon.	November 4, 2024	14:30:00	(1) Lecture 1: Average Power **456**	**AC Power analaysis** **(CHAPTER 11)** **PAGE 455**	**Problemset 10-Chapter 11**	
	Tues.	November 5, 2024	11:30:00	(2) Lecture 2: RMS Values **465**			
	Wed.	November 6, 2024	11:30:00	(3) Lecture 3: Power Factor **468**			
	Thurs.	November 7, 2024	13:30:00	(4) Lecture 4: Complex Power **471**			
	Thurs,Thus-Lab	Nov 5,7, 2024 15:00	15:00:00	**Lab 10**: Second Order RLC Circuits		Tues. Nov 12, 2024 11:30	
Week 11	Mon.	November 11, 2024	14:30:00	(1) Lecture 1: Holiday	**OPERATIONAL AMPLIFIERS** **(CHAPTER 5)** **PAGE 173**	**Problemset 11-Chapter 5**	
	Tues.	November 12, 2024	11:30:00	(2) Lecture1& 2: Definition of Op-Amp **174**-Ideal op-amp vs Real Op-Amp **178**			
	Wed.	November 13, 2024	11:30:00	(3) Lecture 3: Inverting and Non-Inverting Op-Amps **179**			
	Thurs.	November 14, 2024	13:30:00	(4) Lecture 4: Summing and Difference Op-Amps **183**-Op-amp Applications **194**			
	Thurs,Thus-Lab	Nov 12,14,2024 15:00	15:00:00	**Lab 11**: AC Measurements		Mon. Nov 18, 2024 14:30	
Week 12	Mon.	November 18, 2024	14:30:00	(1) Lecture 1: Mutual inductance **555**	**Transformers** **(CHAPTER 13)** **PAGE 555**	**Problemset 12-Chapter 13**	**Quiz 3** **Chapter 10-11-5** Thursday Nov 21, 2024 13:30
	Tues.	November 19, 2024	11:30:00	(2) Lecture 2: Ideal Transformer **571**			
	Wed.	November 20, 2024	11:30:00	(3) Lecture 3: Reflected Impedance **574**			
	Thurs.	November 21, 2024	13:30:00	(4) Lecture 4: **Quiz 3**			
	Thurs,Thus-Lab	Nov 19,21,2024 15:00	15:00:00	**Lab 12**: AC Measurements in an RC circuit		Mon. Nov 25, 2024 14:30	
Week 13	Mon.	November 25, 2024	14:30:00	(1) Lecture 1: Balanced Three-Phase Circuits **503**	**Three-Phase Circuits** **(CHAPTER 12)** **PAGE 501**	**Problemset 13-Chapter 12**	
	Tues.	November 26, 2024	11:30:00	(2) Lecture 2: Y and Δ Connections **507-510**			
	Wed.	November 27, 2024	11:30:00	(3) Lecture 3: Review 3-Phase Circuit			
	Thurs.	November 28, 2024	13:30:00	(4) Lecture 4: Review 3-Phase Circuit			
	Thurs,Thus-Lab	Nov 26,28,2024 15:00	15:00:00	**Lab 13**: POWER in AC or Simple Op-Amp Circuits		Mon. Dec 2, 2024 14:30	
Week 14	Mon.	December 2, 2024	14:30:00	(1) Lecture 1: Review			
	Tues.	December 3, 2024	11:30:00	(2) Lecture 2: Review			
	Wed.	December 4, 2024	11:30:00	(3) Lecture 3: Review			
	Thurs.	December 5, 2024	13:30:00	(4) Lecture 4: Review			
	Thurs,Thus-Lab	Dec 3,5, 2024 15:00	15:00:00	**Lab 14**: 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 noticed is required. Deadlines scan be reviewed on the CAL exams page. http://camosun.ca/services/accessible-learning/exams.html

COURSE GUIDELINES & EXPECTATIONS

GRADING ACCORDING TO COLLEGE POLICY (GPA)

A minimum of 60% must be achieved in both the theory and lab portions to pass the course. Less than 60% in either portion will result in a failure of the entire course and **minimum of 50% must be achieved in Final exam to pass the course.**

-To earn credit for the course, it is essential to complete *all labs and lab reports* satisfactorily.
-Please ensure that you submit your lab reports by the specified due date on D2L.
 (Typically, lab reports are expected to be turned in at the beginning of the next week's lab session.)
- For every day your labs are late, there will be a 10% deduction from your score.
-You are required to attend and be on time for ALL labs.
-Failure to attend a lab without a valid excuse may result in being assigned a failing grade for that lab.
-If you cannot attend a lab (for a valid reason) please inform your lab instructor (ahead of time if possible) and arrange to make it up.

Lecture Attendance

To get the most out of this course, students are expected to attend all classes and be on time. It is your responsibility to acquire all information given during a class missed, including notes, hand-outs, changed exam dates etc.

Exam Procedures
All exams must be written at the scheduled times with the exception of students requiring an accommodation by CAL. It is understood that emergency circumstances do occur (e.g. severe illness or family emergency); for such circumstance's accommodation may be offered at the discretion of the instructor, provided the student:
a) notifies the instructor in advance of the exam (not after), and
b) provides documented evidence of the circumstance (e.g. medical certificate).

If an exam is missed with an excused absence, it is up to the instructor's discretion as to how the mark will be made up. In most cases, an oral exam will be scheduled for the student as soon as possible.
Be sure not to make travel plans for the end of semester until the final exam schedules are finalized and posted. Please ask any family members who might make travel plans on your behalf to consult you before booking tickets.
Please note: the use of cell phones during a test or quiz is not allowed and may result in a zero for that assessment.

Study Habits

Good and regular study habits are essential to do well in this course. You should plan on a weekly minimum of 5 hours outside of scheduled class time for the completion of readings, assignments and for general studying. Joining a study group can help make this more achievable.
Lecture presentations will be uploaded to the course website. These should be used as a study guide, not as your sole source of information. You will need to write down additional key words for examples and explanations given during lecture and review text and videos to support your understanding. It is also recommended practice to transform lecture notes into a study-friendly format after each lecture, incorporating additional information from your textbook. Study these notes before the next class to prepare yourself for new material, which will often build on previously covered material.

Please take advantage of office hours if you need extra clarification and help.

SCHOOL OR DEPARTMENTAL INFORMATION

Electronics and computer Engineering

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.

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/.

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
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.

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.