COURSE SYLLABUS

COURSE TITLE: PHYS-210: Electricity and Magnetism

CLASS SECTION: X01A/B & X02A/B

TERM: Fall 2022

COURSE CREDITS: 4

DELIVERY METHOD(S): Lecture

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 information please visit https://legacy.camosun.ca/covid19/index.html.

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. Julie Alexander

EMAIL: jalex@camosun.bc.ca

OFFICE: Tech 220

HOURS: M: 10:30 AM – 11:30 AM , 1:30 – 3:30, T: 11:30 AM – 12:20 PM , W: 12:30 -1:20, 2:30-3:20

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

This is a calculus-based course in electricity and magnetism. Topics include electrostatics, including Coulomb's law and Gauss's law for uniform and non-uniform charge distributions; capacitance and dielectrics; electric circuits, including RC circuits; magnetic fields, including the Biot-Savart law and Ampere's law; electromagnetic induction and applications using Lenz's law; and LR circuits and Maxwell's equations.

PREREQUISITE(S):
Restricted to students in Engineering Bridge

All of:
• C in MATH 250B

CO-REQUISITE(S):
See Pre-requisites

EXCLUSION(S):
Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course students will be able to:

1. Provide and define the fundamental properties of the electric charge, solve technical problems associated with the electrostatic force (Coulomb force), the electric force field, Gauss's Law, the electric potential and potential difference, within a framework of distributed symmetric charge distributions, using calculus.
2. Define electric capacitance and solve technical problems associated with capacitors of various symmetries, capacitors in series and parallel combination, the microscopic effect of dielectric materials on capacitance and stored energy.
3. Define electric current, current density, and solve technical problems involving DC networks of resistors, batteries, and capacitors, Ohm's Law, Kirchhoff's Laws, and RC charging and decay circuits.
4. Define the magnetic field and magnetic flux, solve technical problems associated with the effect of static, non-uniform and uniform magnetic fields on moving charges and current-carrying wires, loops and the magnetic dipole.
5. Calculate the magnitude and direction of the magnetic field for symmetric current distributions using the Law of Biot-Savart and Ampere's Law, and state the limitations of Ampere's Law.
6. State Faraday's Law of Induction with Lenz's Law and use these equations to solve technical problems associated with induction.
7. Calculate inductance according to the fundamental definition, solve technical problems associated with LR circuits and coils, and calculate the stored energy in magnetic fields.
8. Quote the four Maxwell's equations, define all the terms, and demonstrate knowledge of the historical background leading to their development, with particular attention to the concept of the displacement current.
9. Observe record, organize and display data in tables, graphs or charts.
10. Analyze linear graphs (determine area, slope, intercept, etc.).
11. Observe and record sources of error and estimate/compute uncertainty in results.
12. Interpret meaning of experimental results in the context of the experimental objectives.
13. Write scientific reports in an acceptable, traditional format.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Lab Manual for Physics 210 (available at the bookstore)

Scientific calculator

Optional textbook is University Physics with Modern Physics, 14th ed, by Young and Freedman

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

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

			Physics 210 Lecture Schedule (X01 & X02)		
	Fall 2022		Instructor: Dr. Julie Alexander		
			Mech Tutorials X01 - Tuesdays		
			Elect Tutorials X02 - Thursdays		
Date	**Week**	**Lecture**	**Topics**	**Chapters in Text**	**Other Notables**
06-Sep	1	#1	Introduction/ Day 1 test		No tutorials or labs
		#2	Math Review	Chapters 2-4	
		#3	Physics Review	Chapters 2-4	
12-Sep	2	Mon	Electric charge, Coulombs Law	Chapter 21	Tutorial #1
		Wed	Electric fields	Chapter 21	Excel Lab
		Fri	Electric field of continuous charge	Chapter 21	
19-Sep	3	Mon	Electric field of continuous charge	Chapter 21	Tutorial #2
		Wed	Electric field of continuous charge	Chapter 21	Matlab Lab
		Fri	Electric field lines, charges in E	Chapter 21	
26-Sep	4	Mon	Electric flux, Gauss Law	Chapter 22	Tutorial #3
		Wed	Applications of Gauss Law	Chapter 22	E Field mapping Lab
		Fri	Holiday		
03-Oct	5	Mon	Applications of Gauss Law	Chapter 22	Tutorial #4
		Wed	Conductors in electrostatic equilibrium	Chapter 22	e/m lab
		Fri	Catch up and review for test 1		
10-Oct	6	Mon	Holiday		No tutorials or labs
		Wed	**Test #1 on Ch 21 & 22 (Oct. 12)**		
		Fri	Electric Potential	Chapter 23	

17-Oct	7	Mon	V due to point charges, Electric PE, Obtaining E given V	Chapter 23	Tutorial #5
		Wed	V due to continuous charge	Chapter 23	Climate talk in lab
		Fri	V due to continuous charge	Chapter 23	
24-Oct	8	Mon	Capacitance, Combinations of C	Chapter 24	Tutorial #6
		Wed	Energy stored in a capacitor	Chapter 24	Resisitivity lab
		Fri	Dielectrics, electric dipole	Chapter 25	
31-Oct	9	Mon	Electric Current	Chapter 25	Tutorial #7
		Wed	Resistance and resistivity	Chapter 25	Capacitance lab
		Fri	Resistance and temperature, power	Chapter 26	
07-Nov	10	Mon	Electric circuits, Kirchoff's Rules	Chapter 27	Tutorial #8
		Wed	Magnetic fields and forces	Chapter 27	Kirchoff Lab
		Fri	Holiday Nov 11		
14-Nov	11	Mon	Magnetic force on wire	Chapter 27	Tutorial #9
		Wed	Torque on current loop	Chapter 27	Magnetic force Lab
		Fri	Motion of charged particle in a B field	Chapter 27	
21-Nov	12	Mon	Biot-Savart Law	Chapter 28	No tutorials or labs
		Wed	**Test #2 on Ch 23 -27 (Nov. 23)**		
		Fri	Biot-Savart Law	Chapter 28	
28-Nov	13	Mon	Force between 2 wires, Ampere's Law	Chapter 28	Tutorial #10
		Wed	Ampere's Law	Chapter 28	Measurement of B fie
		Fri	Solenoid, magnetic flux, Gauss Law	Chapter 28	
05-Dec	14	Mon	Faraday's Law, motional EMF	Chapter 29	Tutorial #11
		Wed	Lenz's Law, Maxwell's Equations	Chapter 29	No Labs
		Fri	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

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Tutorial Problems	10%
Labs	15%
Two midterm tests	35%
Final Exam	40%
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

SCHOOL OR DEPARTMENTAL INFORMATION

PHYSICS DEPARTMENT GUIDELINES REGARDING TESTING AND GRADING:

- The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar, "students are expected to write tests and final exams at the scheduled time and place." Exceptions will only be considered due to emergency circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.
- Students must write quizzes, tests, midterm tests, etc., on the date and time assigned by the instructor. Missed exams normally receive a zero grade. Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test in exceptional circumstances such as medical issues or a documented illness.
- Any outstanding homework or labs must be submitted prior to the last day of classes, and will be graded according to the late policy outlined by the instructor.
- Refer to your instructor's information page for any additional policies regarding testing and grade calculation.

PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:

- Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.
- Attendance is mandatory & you may be required to "sign in" at the beginning of each lab period. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances. If you will be absent from a lab period due to illness it is your responsibility to notify your instructor.

- At the discretion of the instructor, a student who is repeating this Physics course with a laboratory grade of 70% or higher may apply for lab exemption.

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.

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.