COURSE SYLLABUS

COURSE TITLE: PHYS-210-Electricity and Magnetism
CLASS SECTION: X01A, X01B, X02

TERM: 2024F

COURSE CREDITS: 3

DELIVERY METHOD(S): In Person

Camosun College respectfully acknowledges that our campuses are situated on the territories of the Lək̓ʷəŋən (Songhees and Kosapsum) and WSÁNEĆ peoples. We honour their knowledge and welcome to all students who seek education here.

INSTRUCTOR DETAILS

NAME: Shazhou Zhong

EMAIL: ZhongJ@camosun.ca

OFFICE: LACC 235 (Interurban)

HOURS: M,W 14:30-15:30, F 9:30-10:30, 12:30-13:30 or by appointment

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

Restricted to students in Engineering Bridge

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): C in MATH 250B

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course students will be able to:

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.

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.

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.

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.

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.

State Faraday's Law of Induction with Lenz's Law and use these equations to solve technical problems associated with induction.

Calculate inductance according to the fundamental definition, solve technical problems associated with LR circuits and coils, and calculate the stored energy in magnetic fields.

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.

Observe record, organize and display data in tables, graphs or charts.

Analyze linear graphs (determine area, slope, intercept, etc.).

Observe and record sources of error and estimate/compute uncertainty in results.

Interpret meaning of experimental results in the context of the experimental objectives.

Write scientific reports in an acceptable, traditional format.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

UNIVERSITY PHYSICS with Modern Physics, Hugh Young and Robert Freedman, Pearson, 14th or 15th edition [recommended]

PHYS 210 Lab Manual [available from Bookstore or online]

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.

2024/09/03 - 2024/12/07

PHYS 210 X01A	PHYS 210 X01B	PHYS 210 X02
M 11:30 AM - 12:20 PM Technologies, 173 Lecture T 8:30 AM - 10:20 AM Technologies, 222 Laboratory T 10:30 AM - 11:20 AM Technologies, 174 Lecture Th 10:30 AM - 11:20 AM Technologies, 175 Lecture F 8:30 AM - 9:20 AM Technologies, 181 Lecture	M 11:30 AM - 12:20 PM Technologies, 173 Lecture T 10:30 AM - 11:20 AM Technologies, 174 Lecture W 9:30 AM - 11:20 AM Technologies, 222 Laboratory Th 10:30 AM - 11:20 AM Technologies, 175 Lecture F 8:30 AM - 9:20 AM Technologies, 181 Lecture	M/W 1:30 PM - 2:20 PM Technologies, 222 Lecture Th 8:30 AM - 10:20 AM Technologies, 222 Laboratory Th 1:30 PM - 2:20 PM Centre Business & Access, 102 Lecture F 1:30 PM - 2:20 PM Technologies, 222 Lecture

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 can be reviewed on the CAL exams page.
https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams

Week	Lecture 1 Monday	Lecture 2 Tues/Wed	Laboratory Tues/Thurs	Lecture 3 Thursday	Lecture 4 Friday	Textbook Chapters
1 9/2-9/6	Labour day College CLOSED	Introduction review	Lab 1 Uncertainty Graphing Lab	Properties of charges	Coulomb's Law	21.1-21.3
2 9/9-9/13	Coulomb's Law	Electric Field Electric Forces	Lab 2 Electric Field	Electric Field Electric Forces	Tutorial 1 Math	21.3-21.5
3 9/16-9/20	Distributed Charge	Electric Field lines	Lab 2a Electric Field	Electric Dipole Charge and Flux	Tutorial 2 Electric Fields	21.6-21.7
4 9/23-9/27	Electric Dipole Charge and Flux	Gauss's Law	Lab Period CK Review	Gauss's Law Applications Charges on Conductors	CK #1	22.1-22.5
5 9/30-10/4	National Day for Truth and Reconciliation College CLOSED	Electric Potential Point Charges	Lab Period	Electric Potential Point Charges Lines, Spheres	Tutorial 3 Electric Flux	23.1 – 23.2
6 10/7-10/11	Electric Potential Spheres Plates Cylinders	Equipotential Surfaces	Lab Period	Gradients in Equipotential Surfaces	Tutorial 4 Gauss's Law	23.2-23.4
7 10/14-10/18	Thanksgiving Day College CLOSED	Capacitance Definition/Unit	Lab 3 Capacitor	Parallel Plate Spherical Cylindrical	Tutorial 5 Electric Potential	23.5 24.1
8 10/21-10/25	Series and Parallel Capacitors	Energy Storage Dielectrics	Lab 5 Resistivity of NiCr	Electric Current Resistivity Resistance	CK #2	24.2 – 24.4 25.1 – 25.3
9 10/28-11/1	Ohm's Law Electric Power	Resistor Combinations	Lab 6 RC circuit	Resistor Combinations Kirchhoff Laws	Tutorial 6 Capacitors	26.1 – 26.4
10 11/4-11/8	Kirchhoff Laws RC Circuit	RC Circuit Magnetic Fields Field Lines, Flux	Lab 7 Kirchhoff's Law	Forces on Charges and Wires in Magnetic Fields	Tutorial 7 Capacitor Combo Resistivity	26.4 27.1 – 27.3 27.6 – 27.8
11 11/11-11/15	Remembrance Day College CLOSED	Biot-Savart Law Applications Elements, Wires	Lab Period	Force between Wires Mag Field Loop	Tutorial 8 Resistivity B force on Charges	28.2-28.3 28.4 – 28.7
12 11/18-11/22	Ampere's Law Wires, Solenoids	Magnetic Induction Faraday / Lenz	Lab 8 Magnetic Force on wires	Motional EMF	CK #3	29.1 – 29.5
13 11/25-11/29	Displacement Current	Self-Inductance Magnetic Energy	Lab 9 Magnetic Induction	LR Circuit	Tutorial 11 B field and Induction	29.7 30.2 – 30.4
14 12/2-12/6	Summary of Maxwell's Equations	Review	Review	Review	Review	32.1

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Homework	10
Celebrations of Knowledge (3, drop 1)	30
Laboratory Reports	20
Final Celebration of Knowledge	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.

https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf

COURSE GUIDELINES & EXPECTATIONS

- Course content, announcements, and important class information will be posted on D2L. Students must check D2L regularly.
- Homework will be assigned and will be submitted to D2L folders.
- Three (3) midterm tests will occur at the dates and times listed below. Out of the three midterm tests, the lowest midterm grade will be dropped for each student to make up the 30% weighting.
- The lab reports will be submitted to D2L folders. Lab reports are due ONE WEEK after the date of the lab exercise. Attendance and submission of Lab reports is mandatory and required to obtain credit in the course

SCHOOL OR DEPARTMENTAL INFORMATION

PHYSICS DEPARTMENT GUIDELINES REGARDING TESTING AND GRADING:

- 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 illness and emergency circumstances. Holidays or scheduled flights are not considered to be emergencies.
- Missed exams normally receive a zero grade. Instructors are not required to provide make-up tests.

PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:

Laboratory activities involve practical applications of your knowledge and manual skills development. Development of these skills is a requirement to meet the Course Learning Outcomes.

- Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.
- Unless otherwise stated by your instructor, late penalties are as follows: For overdue labs, a late penalty of 10% per day will be assessed following the due date.-

- 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.

MISSED LABS GUIDELINES:

- Laboratory activities are in-person activities; attendance and participation are required. Reports will not be accepted from students who did not attend the lab period.
- If you arrive more than 30 minutes late to the lab, you may be recorded as absent.
- Students who will miss a laboratory session have an obligation to seek out concessions directly from their instructor in a timely manner, BEFORE the lab period occurs. In the event of unforeseen circumstances, lab instructors must be notified within 24 hours of the missed lab period, or concessions will not be available.
- If you miss up to three (3) laboratory sessions, you are still eligible to meet the Learning Outcomes for the course, though missed labs may receive a zero grade.
- If you miss a total of four (4) or more labs for any reason including, but not limited to: life circumstances, illness, family or pet obligations, planned vacations, milestone family events, work commitments, competitive athletic events., you will be unable to meet the learning outcomes for the class and will receive a failing grade (F) in the entire course, regardless of marks received on graded lab and lecture components. Exceptions will only be considered through an academic concession granted by the instructor or Dean/Associate Dean.
- Please note that if you are suffering from a serious medical illness that prevents you from participating in this course, Camosun College has a Compassionate Medical Withdrawal Policy (https://camosun.ca/services/forms#medical

GENERAL IN-PERSON ASSESSMENT RULES FOR STUDENTS – PHYSICS AND ASTRONOMY DEPARTMENT:

The rules are used for on-campus quizzes, tests, and exams in the Physics and Astronomy department. A Faculty member will actively supervise throughout the examination. The instructor may move around the room or sit at the front or back of the room.

By entering the exam room, students agree to abide by the following rules:

- Turn off all electronic communication devices (including, but not limited to: cellphones, smartwatches, laptops, tablets) before entering and place them on a designated table at the front of the exam room.
- All bags must be on the sides, back, or front of the room – the instructor will identify the appropriate place.
- Students are not permitted to wear brimmed hats or hoodies during in-person assessments.
- Students may bring pens, pencils, calculator, highlighters, erasers, ruler, protractor, and a drink in a closed container. If permitted in the room, students may have a snack in its original packaging or a clear container.
- Calculators must be scientific, non-textual calculators, with no notes of any kind in the case.
- Items brought into the room may be inspected by the Faculty member.
- If you arrive late for the examination, no additional time will be provided. Students arriving more than 30 minutes late may not be allowed to enter the room.
- For biological breaks, permission to leave the exam room must be obtained. Only one student at a time may leave the room, and biological breaks must be as brief as possible.
- Access to any online materials during exams is prohibited.
- Any work submitted on an examination must be entirely your own.

- Students found communicating with one another in any way or under any pretext; having unauthorized books, papers, electronic computing devices, data storage, or communication devices in view, even if their use is not proved; or found cheating in any way may receive a zero grade. All incidents will be recorded and managed according to the College's Academic Integrity Policy.

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 camosun.ca/services.

Support Service	Website
Academic Advising	camosun.ca/services/academic-supports/academic-advising
Accessible Learning	camosun.ca/services/academic-supports/accessible-learning
Counselling	camosun.ca/services/health-and-wellness/counselling-centre
Career Services	camosun.ca/services/co-operative-education-and-career-services
Financial Aid and Awards	camosun.ca/registration-records/financial-aid-awards
Help Centres (Math/English/Science)	camosun.ca/services/academic-supports/help-centres
Indigenous Student Support	camosun.ca/programs-courses/iecc/indigenous-student-services
International Student Support	camosun.ca/international
Learning Skills	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills
Library	camosun.ca/services/library
Office of Student Support	camosun.ca/services/office-student-support
Ombudsperson	camosun.ca/services/ombudsperson

Support Service	Website
Registration	camosun.ca/registration-records/registration
Technology Support	camosun.ca/services/its
Writing Centre	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills

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 Integrity

Students are expected to comply with all College policy regarding academic integrity; which is about honest and ethical behaviour in your education journey. The following guide is designed to help you understand your responsibilities: https://camosun.libguides.com/academicintegrity/welcome
Please visit https://camosun.ca/sites/default/files/2021-05/e-1.13.pdf for Camosun's Academic Integrity policy and details for addressing and resolving matters of academic misconduct.

Academic Accommodations for Students with Disabilities

Camosun College is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging appropriate academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a documented disability and think you may need accommodations, you are strongly encouraged to contact the Centre for Accessible Learning (CAL) and register as early as possible. Please visit the CAL website for more information about the process of registering with CAL, including important deadlines: https://camosun.ca/cal

Academic Progress

Please visit https://camosun.ca/sites/default/files/2023-02/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 https://camosun.ca/sites/default/files/2021-05/e-2.2.pdf for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit https://camosun.ca/registration-records/tuition-fees#deadlines.

Grading Policy

Please visit https://camosun.ca/sites/default/files/2021-05/e-1.5.pdf for further details about grading.

Grade Review and Appeals

Please visit https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf for policy relating to requests for review and appeal of grades.

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 (see Medical/Compassionate Withdrawals policy). Please visit https://camosun.ca/services/forms#medical to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence

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 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 Policy: https://camosun.ca/sites/default/files/2021-05/e-2.9.pdf and camosun.ca/services/sexual-violence-support-and-education.

To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-370-3841

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 https://camosun.ca/sites/default/files/2021-05/e-2.5.pdf to understand the College's expectations of academic integrity and student behavioural conduct.

Looking for other policies?

The full suite of College policies and directives can be found here: https://camosun.ca/about/camosun-college-policies-and-directives

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.