COURSE SYLLABUS

COURSE TITLE: PHYS-105: General College Physics 2

CLASS SECTION: 001AB

TERM: Winter 2024

COURSE CREDITS: 3

DELIVERY METHOD(S): Face-to-Face

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.

INSTRUCTOR DETAILS

NAME: Chris Avis (Lecture, Lab section 001A), Mike Zhong (Lab section 001B)

EMAIL: avisc@camosun.ca; zhongm@camosun.ca

OFFICE: Fisher 346B

HOURS: Mon., Wed.: 10:30-11:20; Tue., Thu.: 12:30-1:20, Fri.: 11:30-12:20

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

PHYS 105 continues the survey of General College Physics topics. Students will explore properties of vibrations, wave motion and sound, geometric optics, the properties of electric and magnetic fields and simple DC circuits.

PREREQUISITE(S):
All of:
• C in PHYS 104
CO-REQUISITE(S):
Not Applicable
EXCLUSION(S):
Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

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

1. Examine common physical systems subject to periodic motion and study the propagation of waves on strings and in air columns.
a. Apply Hooke's Law and elastic potential energy to problems involving mass-spring systems
b. Define the terms period, frequency and angular frequency and evaluate these quantities for mass-spring

systems and simple pendulums.
c. State the principal of superposition and describe the properties of waves undergoing constructive and destructive interference.
d. Compare and contrast wave propagation on strings and in air columns including wave speed dependence on medium characteristics.
e. Solve problems involving the Doppler effect and beats
f. State the conditions for standing waves and apply these conditions to solve technical problems of vibrating strings and air columns, including fundamental modes and harmonics.

2. Investigate laws of geometric optics and use them to solve technical problems involving refraction, reflection, and image formation (in mirrors and lenses).
a. State laws of reflection and refraction and apply laws to calculate paths of light rays at interfaces between materials.
b. Solve technical problems involving dispersion and total internal reflection as special applications of refraction.
c. Solve technical problems involving image formation with spherical mirrors, lenses and simple optical devices (cameras, the eye, simple magnifiers, microscopes and telescopes), including ray diagrams.

3. Apply concepts of dynamics, work and energy to analyze the behavior of charged particles in electric fields.
a. Calculate electric fields, forces, potential and potential energy for point charges and simple charge distributions.
b. Solve technical problems involving the motion of charged particles moving in uniform electric fields
c. Solve technical problems involving energy storage in capacitors and combinations of capacitors.

4. Use principles of electrical energy transfer to solve problems involving multi-branch Direct Current
a. Apply the concept of resistivity to calculate the resistance of a resistor with specified geometry
b. Use Ohm's Law to determine the current flow through a resistor.
c. Calculate the power output of electrical devices.
d. Identify the characteristics of current, resistance and voltage in series and parallel circuits and apply these concepts to the analysis of multi-branch circuits involving networks of resistors and batteries
e. Outline the effect of internal resistance in batteries and appropriately account for its effects in circuit analysis.
f. Solve multi-branch electric circuit problems using Kirchoff's Laws.
g. Set up simple DC circuits and demonstrate the use of a multimeter to measure resistance, current and voltage

5. Investigate the source of magnetic fields, forces on charges in magnetic fields and applications of magnetism to electromagnetic induction.
a. Describe the origin of magnetic fields and calculate the magnetic field produced by long wires and solenoids
b. Calculate the forces acting on charged particles and wire loops in uniform magnetic fields.
c. Describe the concept of magnetic flux, induced emf and back emf and relate these concepts to the function of electric motors and generators
d. Solve technical problems involving Faraday's Law of Induction, Lenz's Law and motional emf.

6. Explore key experiments that led to the development of modern quantum theory.

a. Describe the photoelectric effect experiment and the photon model of light.
b. Solve technical problems involving energy carried by photons and the photoelectric effect.
c. Apply Bohr's model of the atom to solve technical problems involving energy transitions in the hydrogen atom.

7. Analyze, interpret, and report on experimental results in the context of experimental objectives.
a. Observe, record, organize and display data in tables, and record sources of error and determine the uncertainty in results
b. Plot and analyze linear graphs (determine area, slope, intercept, including uncertainties)
c. Convey findings in scientific reports written in an acceptable, traditional discipline-specific format

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Required materials:

- Scientific calculator
- Ruler
- Access to a computer with Microsoft Excel. (Students can access Excel through the Microsoft Office Suite available free to students here: https://legacy.camosun.ca/services/its/other-services.html.)

Optional material:

- Physics 105 Lab Manual
- Physics by Giancoli, 7th Edition (Copies available in Lansdowne Campus Library and the Bookstore)

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. The lecture schedule is approximate.

WEEK	ACTIVITY or TOPIC	DUE DATES
WEEK #1		
Mon. Jan. 8th	Introduction and Uncertainties Review	
Tues. Jan. 9th	Uncertainties Review / 1.1: Hooke's Law	
Weds. Jan. 10th	1.2: Simple Harmonic Motion	
Thurs. Jan. 11th	1.3: Energy in SHM	
Fri. Jan. 12th	Lab #1: Simple Harmonic Motion – Part 1	
WEEK #2		
Mon. Jan. 15th	1.4: The Simple Pendulum	
Tues. Jan. 16th	1.5: Damped HM; 1.6: Forced HM	
Weds. Jan. 17th	2.1: Properties of Waves	
Thurs. Jan. 18th	2.2: Wave Speed; 2.3: Superposition of Waves	Quiz #1
Fri. Jan. 19th	Lab #1: Simple Harmonic Motion – Part 2	
WEEK #3		
Mon. Jan. 22nd	2.4: Standing Waves on a String	
Tues. Jan. 23rd	3.1: Characteristics of Sound Waves	
Weds. Jan. 24th	3.2: The Decibel Scale	
Thurs. Jan. 25th	3.3: Standing Waves in Air Columns	Quiz #2
Fri. Jan. 26th	Lab #2: Standing Waves on a String	Lab #1 Due

WEEK	ACTIVITY or TOPIC	DUE DATES
WEEK #4		
Mon. Jan. 29th	3.4: Interference and Beats	
Tues. Jan. 30th	3.5: The Doppler Effect	
Weds. Jan. 31st	4.1: Properties of Light	
Thurs. Feb. 1st	4.2: Plane Reflection	Quiz #3
Fri. Feb 2nd	Lab #3: Standing Waves in an Air Column	Lab #2 Due
WEEK #5		
Mon. Feb. 5th	4.3: Image Formation by Spherical Mirrors	
Tues. Feb. 6th	4.4: Refraction	
Weds. Feb. 7th	4.5: Image Formation by Thin Lenses	
Thurs. Feb. 8th	4.6: Combinations of Lenses, 4.7: Optical Instruments	Quiz #4
Fri. Feb. 9th	Test #1 – Modules 1, 2 and 3	Homework Check #1
WEEK #6		
Mon. Feb. 12th	Review of Vectors	
Tues. Feb. 13th	5.1: Electric Charge and Methods of Charging	
Weds. Feb. 14th	5.2: Coulomb's Law	
Thurs. Feb. 15th	5.2: Coulomb's Law / 5.3: The Electric Field	Quiz #5
Fri. Feb. 16th	Lab #4: Reflection and Refraction	Lab #3 Due
WEEK #7		
Mon. Feb. 19th	**Family Day – College Closed**	
Tues. Feb. 20th	**Reading Break – No classes**	
Weds. Feb. 21st	**Reading Break – No classes**	
Thurs. Feb. 22nd	**Reading Break – No classes**	
Fri. Feb. 23rd	**Reading Break – No classes**	
WEEK #8		
Mon. Feb. 26th	5.3: The Electric Field	
Tues. Feb. 27th	5.4: Motion of a Charge in a Uniform Electric Field	
Weds. Feb. 28th	6.1: Electric Potential and Electric Potential Energy	
Thurs. Feb. 29th	6.2: Equipotentials and Field Lines; 6.3: Electric Potential and Potential Energy due to Point Charges	Quiz #6
Fri. Mar. 1st	Lab #5: Concave Mirrors and the Thin Lens	Lab #4 Due
WEEK #9		
Mon. Mar. 4th	6.3: Electric Potential and Potential Energy due to Point Charges	
Tues. Mar. 5th	6.4: Capacitors / Combinations of Capacitors	
Weds. Mar. 6th	7.1: Electric Current; 7.2: Ohm's Law	
Thurs., Mar. 7th	7.3: Power and Household Electricity	Quiz #7
Fri. Mar. 8th	Test #2: Modules 4 and 5	Homework Check #2
WEEK #10		
Mon. Mar. 11th	7.4: Resistivity and Internal Resistance	
Tues. Mar. 12th	7.5: Series and Parallel Circuits	
Weds. Mar. 13th	7.6: Mixed Circuits	
Thurs., Mar. 14th	7.7: Kirchoff's Rules	Quiz #8
Fri. Mar. 15th	Lab#6: Ohm's Law and Combinations of Resistors	Lab #5 Due

WEEK	ACTIVITY or TOPIC	DUE DATES
WEEK #11		
Mon. Mar. 18th	7.7: Kirchoff's Rules	
Tues. Mar. 19th	8.1: Properties of Magnets	
Weds. Mar. 20th	8.2: The Magnetic Force on a Moving Charge	
Thurs. Mar 21st	8.3: Motion of a Charge in a Uniform Magnetic Field	Quiz #9
Fri. Mar. 22nd	Lab #7: Kirchoff's Rules	Lab #6 Due
WEEK #12		
Mon. Mar. 25th	8.4: Magnetic Forces and Torques on Wires	
Tues. Mar. 26th	8.6: Ampere's Law	
Weds. Mar. 27th	8.7: The Magnetic Force between Parallel Wires	
Thurs. Mar. 28th	9.1: Induced EMF	Quiz #10
Fri. Mar. 29th	**Good Friday – College Closed**	
WEEK #13		
Mon. Apr. 1st	**Easter Monday – College Closed**	
Tues. Apr. 2nd	9.2: Faraday's Law of Induction and Lenz' Law	Lab #7 Due
Weds. Apr. 3rd	9.3: EMF Induced in a Moving Conductor	
Thurs. Apr. 4th	10.1: The Photoelectric Effect	Quiz #11
Fri. Apr. 5th	Test #3: Modules 6 and 7	Homework Check #3
WEEK #14		
Mon. Apr. 8th	10.2: Bohr's Theory	
Tues. Apr. 9th	Review	
Weds. Apr. 10th	Review	
Thurs. Apr. 11th	Review	Quiz #12
Fri. Apr. 12th	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
Homework	5 %
Labs*	25 %
Quizzes	15 %
Tests (Best 2 of 3)	25 %
Final Exam	30 %
TOTAL	100%

* Lab #1 will be a formal lab and worth twice the weight of the others

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

DEPARTMENTAL INFORMATION

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 event., 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

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.

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.

COURSE GUIDELINES & EXPECTATIONS

Homework

Homework problems are designed to help you master problem solving skills and prepare you for the term tests. Homework will be checked during the term tests; full solutions will be posted online to allow you to check your work. Homework will be checked for completeness only and an overall grade will be assigned based on the fraction of the homework deemed to be complete.

Quizzes

Short, weekly quizzes will be delivered at the end of the lecture on the Thursday of each week. Quizzes will be heavily based on the previous week's homework and are designed to give you quick formative feedback on your mastery of material.

Labs

Labs assigned in a particular week will be due by the end of the day (11:59 PM) on the Friday of the following week. Exceptions will apply in week when there are tests in which case, students will have an additional week to complete a lab that would otherwise be due on a test day.

Late Policies

Students requiring an extension to labs or homework due to illness or other extenuating circumstances must contact me prior to the due dates. Otherwise, late penalties will apply as noted. For overdue assignments, a late penalty of 10 % per day will be assessed.

All late assignments must be submitted by 11:59 PM on Saturday, April 13th ; after this point, outstanding assignments will receive a mark of zero. Students that miss a scheduled lab, quiz or test **must contact me within 24 hours of their absence** with a valid reason for their absence. Otherwise, a grade of zero will be applied to the missed item.

Study Habits

Physics 105 is a fast-paced, challenging course. You can anticipate spending at least 5 hours a week outside of class to master the material. I strongly recommend that you attend the face-to-face lectures to stay on pace with the material and be able to clarify any questions you might have. Students who have been successful in the course have also recommended forming study groups, accessing the Science Help Centre and regular (and early) visits to office hours.

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.

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.