

COURSE SYLLABUS



COURSE TITLE: PHYS-105: General College Physics 2

CLASS SECTION: 001

TERM: 2022S

COURSE CREDITS: 4

DELIVERY METHOD(S): Face to Face in-person

Camosun College campuses are located on the traditional territories of the Ləkʷəŋən 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: ED NELSON (Office 250 370 4435) (Text 250 884 6266)

EMAIL: nelson@camosun.ca

OFFICE: TECH 218 OR FISHER 322

HOURS: MTWThF 1:30 – 2:30 pm or by appointment or by Collaborate video

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 principle 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

Text: Physics: Principles and Applications 7th edition or similar, Douglas Giancoli, Pearson (pub)

Lab Manual: PHYS 104/105 Lab Manual (Camosun)

Other materials: scientific calculator, drawing instruments

-access to computer with MS Word*, MS Excel*. (Computer labs are available on campus)

-access to a cellphone, scanner or camera capable of generating PDF documents to submit lab reports, homework

*MS Word and MS Excel are available as part of the Office 365 suite provided free to all Camosun students. Please see <http://camosun.ca/services/its/other-services.html> for details.

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.

Please see the PHYS 105 Timeline at the end of this document.

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 notice is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Homework	10
Midterms (3)	30
Laboratory Reports	25
Final Exam	35
	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](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/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 every week 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:

- 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 and 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.
- Unless otherwise stated by your instructor late penalties are as follows: For overdue labs (or assignments), a late penalty of 1 mark per day (10%) will be assessed for the first five days following the due date. After this date a complete report is still required and earns a maximum mark of 50%.
- 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.
- Students will complete a minimum of 9 laboratory experiments including 3 formal reports (with full uncertainty calculations) and at least one lab using technology to perform data analysis.

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](http://camosun.ca/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.

PHYSICS 105 – 001 TIMELINE 2022 Summer

Online QUIZ: EASY problems referring to Lecture Material of the week. **CK (Celebration of Knowledge):** Midterm Tests (Drop lowest mark of the three)

Week	Monday	Tuesday	Wednesday	Thursday	Friday			
1 May 2	Introduction	Uncertainty Review	Lab 1	SHM Description Mass & Spring SHM	Damped Oscillation and Waves	Lab 2	Wave Properties	1
	Hooke's Law Energy in a Spring		Worksheet on Uncertainty			Simple Harmonic Motion QUIZ		
2 May 9	Interference of Waves	Standing Waves on a String	Lab 3	Standing Wave in Air Columns	Doppler Effect	CK #1	Doppler Cont'd	2
	Standing Waves on a String		Standing Waves	Decibel Scale		SHM Waves (May 12)	Beat Effect	
3 May 16	Midterm Review Properties of Light	Ray Tracing Mirrors	Lab 4	The Mirror Equation	Index of Refraction Dispersion	Lab 5	Snell's Law of Refraction	3
	Reflection in Plane Mirror		Refraction of Light	Mirror Equation		Image Formation in Mirrors	Total Internal Refraction – TIR QUIZ	
4 May 23	VICTORIA DAY College Closed	Apparent Depth	Lab 6	Ray Tracing Thin Lenses	Combination of Lenses	CK #2	Optical Power Human Eye	4
			Image Formation in Lenses	Lens Equation		Sound Optics (May 26)	Optical Instruments	
5 May 30	Electric Charge (properties)	Electric Field	Lab 7	Electric Field	Electric Potential	Lab 8	Electric Potential Resistivity	5
	Coulomb's Law		PHET Lab "A" Electric Field (PHYS 140)	Review of Work Electric Potential		PHET Lab "B" and "C" Electric Field (PHYS 140)	Resistance QUIZ	
6 June 6	Ohm's Law Electrical Power	Series & Parallel Combinations	Lab 9	Kirchhoff's Laws	The Magnetic Field Sources	CK #3	Magnetic Force on Charges and Loops	6
	Series and Parallel		Resistivity of Nichrome wire	Kirchhoff's Laws		Lenses E-field (June 9)	Magnetic Induction Faraday's Law	
7 June 13	Motional EMF	Photoelectric Effect	Lab 10	Balmer Series of Hydrogen Atom	Unspecified Lecture Time	Review	Review	7
	Photoelectric Effect		Kirchhoff's Laws	Balmer Series of Hydrogen Atom		Review		
8 June 20	FINALS	FINALS (June 2022)	FINALS					8