

COURSE SYLLABUS



COURSE TITLE: PHYS-104: General College Physics 1

CLASS SECTION: 001

TERM: 2023S

COURSE CREDITS: 4

DELIVERY METHOD(S): Face-to-face, in-person in class and laboratory

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

EMAIL: nelson@camosun.ca

OFFICE: During 2023S: F316 front desk (cell 250 884 6266 for text messages, emergencies)

HOURS: MWF 12:30 – 1:30pm; TTh 1:30 – 2:30pm or by appointment or drop by F316

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 the first part of a survey of physics primarily for students in life sciences and non-science programs. It is suitable for students who require Physics 12 as a pre-requisite. Students explore kinematics, dynamics, work, energy and power, momentum, static equilibrium, thermal energy, fluids, circular motion and gravitation.

PREREQUISITE(S):

One of:

- C in Physics 11
- C in Camosun Alternative

And one of:

- C in Pre-calculus 11; C in MATH 073; C in MATH 077; C in MATH 137; C in MATH 139; C in MATH 173

It is recommended that students who have been away from Physics for more than 5 years should first refresh with PHYS 070 or PHYS 101 or see the Physics chair to gauge skill level. It is also recommended that students

who have been away from math courses for more than 5 years should consult with the Mathematics department to ensure that their math skills are at a level appropriate for this course.

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. Perform addition, subtraction and scalar multiplication of vectors in two-dimensions using graphical and trigonometric techniques.

2. Solve technical problems involving kinematics and dynamics of particles in one- and two-dimensions.
 - a. Define and differentiate between kinematic variables (position, displacement, velocity, speed acceleration)
 - b. Solve technical kinematics problems involving constant acceleration in one-dimension (horizontal and inclined surfaces, and free fall) and two-dimensions (projectile motion).
 - c. Describe Newton's Laws and use Free-Body diagrams to represent forces acting on an object.
 - d. Apply Newton's Laws to solve dynamics problems involving gravitational forces, friction and interacting pairs of objects.

3. Apply conservation principles to solve technical problems involving energy and momentum
 - a. Solve problems involving the work done by constant forces in one-and two-dimensions using the work-kinetic energy theorem.
 - b. Use the conservation of energy principle to solve problems involving gravitational potential energy and dissipative forces.
 - c. Calculate power output and efficiency for simple mechanical systems
 - d. Apply the concepts of momentum and impulse to solve problems involving in collisions in one- and two-dimensions.

4. Apply kinematics and dynamics concepts to the study of circular, rotational and orbital motion
 - a. Use the concept of centripetal acceleration to solve dynamics problems involving objects in uniform circular motion.
 - b. Describe Newton's Law of Universal Gravitation and use this principle to solve problems involving orbital motion.
 - c. Evaluate the torque produced by a force and use the first and second condition for equilibrium to solve problems involving rigid objects in static equilibrium.

5. Solve technical problems involving elastic properties of solids and fluid statics and dynamics.
 - a. Define density, pressure (including gauge pressure), stress, strain and elastic modulus.
 - b. Characterize and evaluate the variation in pressure with depth in a fluid in hydrostatic equilibrium including applications of Pascal's Principle.
 - c. Apply Archimedes' principle to evaluate the buoyant force on objects partially or completely immersed in

fluids.

- d. Solve technical problems involving surface tension and capillary action.
- e. Use the equation of continuity and Bernoulli's equation to qualitatively describe aspects and applications of fluids in motion.

6. Explore energy transfer by thermal mechanisms through investigations into heat exchange, thermal expansion and calorimetry.

- a. Identify common temperature scales and appropriate conversion factors between scales.
- b. Solve technical problems involving the thermal expansion of solids and fluids.
- c. Define and distinguish between the terms temperature, heat, thermal energy, specific heat capacity and latent heat.
- d. Solve technical calorimetry problems including problems involving phase changes of matter.
- e. Describe heat transfer by radiation, thermal conduction and convection.

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

- (a) Physics: Principles with Applications, Douglas C. Giancoli (7th ed.) – strongly recommended
- (b) PHYS 104 Lab Manual
- (c) Scientific Calculator (NB: Cell Phone Calculator App CANNOT be used in midterms, final)
- (d) Drawing Set (ruler, protractor, triangle)
- (e) Access to MS OFFICE (Word, Excel) on Camosun College computers or PC or laptop

MS OFFICE 365 is available free to all Camosun students. See:

<https://camosun.ca/services/its/software-other-services>

Week	Item	Date
2	CK #1	May 11 2023
4	VICTORIA DAY (college closed)	May 22 2023
4	CK #2	May 25 2023
6	CK #3	June 8 2023

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.

LECTURE: F316 MWF 9:30 – 11:20; TTh 9:30 – 10:20
LABORATORY: F316 TTh 10:30 – 12:20

Please see the PHYS 104 001 Timeline/Calendar at the end of this document for a list of lectures, lab exercises, and midterms.

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). <http://camosun.ca/services/accessible-learning/exams.html>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Celebrations of Knowledge/Midterms (drop lowest grade)	35%
Laboratory Exercises (drop lowest grade)	20%
Homework Assignments	5%
Final Celebration of Knowledge (3.0 hour comprehensive)	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](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>

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<https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams>

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 35% 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.

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.

PHYSICS 104 – 001 TIMELINE 2023 Summer

Week	Monday	Tuesday	Wednesday	Thursday	Friday			
1 May 1	Introduction Sig Figs (1)	SI Units/ Prefixes/ Unit Conversion (1)	Lab 1 Measurement Uncertainty Density	Kinematics Definitions (2)	Kinematics in 1D Review (2)	Lab 2 Kinematics in 1D (air track)	Vectors in 2D Graphical (3)	1
	Sig Figs in Calculations (1)			Kinematics in 1D Review (2)			Vector Algebra 2D (3)	
2 May 8	Components of 2D Vectors (3)	Solving Projectile Motion Problems (3)	Lab 3 Projectile Motion (air table)	Newton's Laws of Motion (4)	Friction Dynamics Problems (4)	CK #1 (May 11)	Inclines (4)	2
	Projectile Motion (3)			Weight, Normal Force, FBDs (4)			Connected Objects (4)	
3 May 15	Uniform Circular Motion (5)	Newton's Law of Universal Gravity (5)	Lab 4 Atwood's Pulley (Connected Objects)	Kepler's Laws (5)	Work- Energy Principle (6)	Lab 5 Flying Pig (circular motion)	Potential Energy Gravity / Springs (6)	3
	Uniform Circular Motion (5)			Definition of Work (6)			Conservation of Energy (6)	
4 May 22	VICTORIA DAY College Closed	Conservative and Non- Conservative Work (6)	Lab 6 Work Energy Theorem (Work)	Power and Efficiency (6)	Impulse and Collisions (7)	CK #2 (May 25)	Inelastic/Elastic Collisions (7)	4
				Force & Momentum Conservation (7)			Collisions in 2D (7)	
5 May 29	Centre of Mass (7)	Rotational / Angular Quantities (8)	Lab 7 Conservation of Momentum	Torque (8)	Solving Statics Problems (9)	Lab 8 Static Equilibrium (statics)	Solving Statics Problems (9)	5
	Rotational / Angular Quantities (8)			Static Equilibrium (9)			Elasticity (9)	
6 June 5	Hydrostatics Pressure (10)	Archimedes Principle (10)	Lab 9 Buoyancy Lab	Equation of Continuity (10)	Bernoulli's Equation (10)	CK #3 (June 8)	Surface Tension Capillarity (10)	6
	Pascal's Principle Buoyancy (10)			Bernoulli's Equation (10)			Heat & Specific Heat (14)	
7 June 12	Calorimetry Problems (14)	Latent Heats (14)	Lab 10 Specific Heat of a Metal	Heat Transfer Conduction (14)	Heat Transfer Convection (14)	NO LAB (Review)	REVIEW	7
	Calorimetry Problems (14)			Heat Transfer Radiation (14)			REVIEW	
8 June 19	FINALS	FINALS (June 2023)	FINALS				8	

