COURSE SYLLABUS

COURSE TITLE: PHYS-104: General College Physics 1

CLASS SECTION: RH04

TERM: Winter 2025

COURSE CREDITS: 4

DELIVERY METHOD(S): Face-to-Face Lecture and Lab

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

EMAIL: avisc@camosun.ca

OFFICE: Fisher 346B

HOURS: Office hours by appointment / e-mail

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

Required materials:

- Physics 104 Lab Manual (2022 edition)
- Scientific calculator
- Ruler
- Access to a computer with Microsoft Excel. (Students can access Excel through the Microsoft 365 Suite available free to students here: https://camosun.teamdynamix.com/TDClient/67/Portal/KB/ArticleDet?ID=1614l.)

Optional material:

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

WEEK	ACTIVITY or TOPIC	DUE DATES
WEEK #1		
Mon. Feb. 3rd	Intro. Class / 1.1 Vector Operations (Graphical)	
Tues. Feb. 4th	1.1: Vector Operations (Graphical Approach)	
Weds. Feb. 5th	1.2: Vector Components 1.3: Vector Operations (Component Method)	
Thurs. Feb. 6th	Lab #1: Significant Figures, Scientific Notation, Unit Conversion (Spectrum – Morning / Lunch)	
Fri. Feb. 7th	1.3: Vector Operations (Component Method)	
WEEK #2		
Mon. Feb. 10th	2.1: Position, Distance and Displacement; 2.2: Average and Instantaneous Velocity	Quiz #1
Tues. Feb. 11th	2.3: Kinematics w/ Uniform Acceleration	
Weds. Feb. 12th	2.4: Free-Fall	
Thurs. Feb. 13th	Lab #2: Mechanical Equilibrium in 2-D (Camosun – PM)	Lab #1 Due
Fri. Feb. 14th	**No Classes: Pro-D Day**	

WEEK	ACTIVITY or TOPIC	DUE DATES
WEEK #3		
Mon. Feb. 17th	**No Classes: Family Day**	
Tues. Feb. 18th	3.1: Kinematics in 2-D	Quiz #2
Weds. Feb. 19th	3.1: Kinematics in 2-D / 3.2: Projectile Motion	
Thurs. Feb. 20th	3.2: Projectile Motion	
Fri. Feb. 21st	Formal Lab Report Work Period	
WEEK #4		
Mon. Feb. 24th	Test #1 (Spectrum – AM)	HW Check #1 Due
Tues. Feb. 25th	Lab #3: Deflection of a Loaded Beam (Spectrum AM)	Quiz #3
Weds. Feb. 26th	Lab #3: Deflection of a Loaded Beam (Spectrum AM)	
Thurs. Feb. 27th	4.1: Review of Forces	Lab #2 Due
Fri. Feb. 28th	4.2: Newton's First Law	
WEEK #5		
Mon. Mar. 3rd	4.3: Newton's Second Law	Quiz #4
Tues. Mar. 4th	4.4: Inclined Planes	
Weds. Mar. 5th	4.5: Problems Involving Friction	
Thurs. Mar. 6th	Lab #4: Projectile Motion (Camosun – PM)	Lab #3 Due
Fri. Mar. 7th	4.6: Newton's Third Law and Connected Objects	
WEEK #6		
Mon. Mar. 10th	5.1: Kinematics of Uniform Circular Motion	Quiz #5
Tues. Mar. 11th	5.2: Dynamics of Uniform Circular Motion	
Weds. Mar. 12th	5.3: Newton's Law of Universal Gravitation	
Thurs. Mar. 13th	Test #2 – Spectrum AM	HW Check #2 Due
Fri. Mar. 14th	5.4: Gravity and Orbits **(Spring Break next two weeks)**	Lab #4 Due
WEEK #7		
Mon. Mar. 31st	6.1: Work	Quiz #6
Tues. Apr. 1st	6.2: The Work-Kinetic Energy Theorem	
Weds. Apr. 2nd	6.3: Potential Energy	
Thurs., Apr. 3rd	Lab #5: Circular Motion (Camosun - PM)	
Fri. Apr. 4th	6.4: Conservation of Energy	
WEEK #8		
Mon. Apr. 7th	6.5: Conservation of Energy w/ NC Forces	Quiz #7
Tues. Apr. 8th	7.1: Impulse and Momentum	
Weds. Apr. 9th	7.2: Conservation of Momentum in 1-D	
Thurs., Apr. 10th	Lab #6: Uncertainties (Spectrum – Morning / Lunch)	Lab #5 Due
Fri. Apr. 11th	7.3: Conservation of Momentum in 2-D	
WEEK #9		
Mon. Apr. 14th	8.1: Centre of Mass	Quiz #8
Tues. Apr. 15th	8.2: Torque	
Weds. Apr. 16th	8.3: The Second Condition for Equilibrium	
Thurs., Apr. 17th	Test #3 (Spectrum – AM)	HW Check #3 Due
Fri. Apr. 18th	**Good Friday**	
WEEK #10		
Mon. Apr. 21st	**Easter Monday**	
Tues. Apr. 22nd	8.3: The Second Condition for Equilibrium	Quiz #9
Weds. Apr. 23rd	8.4: Stress and Strain	
Thurs. Apr. 24th	Lab #7: Work and Energy (Camosun - PM)	Lab #6 Due
Fri. Apr. 25th	10.1: Hydrostatic Equilibrium	

WEEK	ACTIVITY or TOPIC	DUE DATES
WEEK #11		
Mon. Apr. 28th	10.2: Pascal's Principle / Gauge Pressure	Quiz #10
Tues. Apr. 29th	10.3: Buoyancy and Archimedes' Principle	
Weds. Apr. 30th	10.3: Buoyancy and Archimedes' Principle	
Thurs. May 1st	Lab #8: Archimedes' Principle (Camosun – PM)	Lab #7 Due
Fri. May. 2nd	10.4: Capillary Effects / 10.5: Fluids in Motion	
WEEK #12		
Mon. May 5th	Test #4 (Spectrum – AM)	HW Check #4 Due
Tues. May 6th	9.1: Temperature, Internal Energy, Thermal Expansion	Quiz #11
Weds. May 7th	9.2: Heat	
Thurs. May 8th	9.3: Calorimetry Problems w/ no Phase Change	Lab #8 Due
Fri. May 9th	9.4: Calorimetry Problems w/ Phase Change	
WEEK #13		
Mon. May 12th	Review	Quiz #12
Tues. May 13th	Review	
Weds. May 14th	Review	
Thurs. May 15th	Final exam	
Fri. May 16th	**No class.**	

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 – Graded for Completion	5 %
Quizzes	10 %
Labs	25 %
Term Tests (Best 3 of 4)	30 %
Final Exam	30 %
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

Dates for the term tests are set as follows:

Test #1: Monday, February 24th **Test #2: Thursday, March 13th**

Test #3: Thursday, April 17th **Test #4: Monday, May 5th**

COURSE GUIDELINES & EXPECTATIONS

Homework

Homework problems are designed to help you master problem solving skills and prepare you for the term tests. Homework either be submitted in person at the end of class or online using the course's dropboxes. Homework problems will be due on Test days with the homework to be submitted corresponding to the sections covered on a particular test. 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 Monday of each week, unless otherwise noted. 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 Thursday of the following week, unless otherwise noted.

Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.

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. In the case of labs, the maximum late mark deduction will be 50% to allow students to obtain a passing mark in the labs.

All late homework and lab assignments must be submitted by 11:59 PM on Friday, May 16th ; after this point, outstanding assignments will receive a mark of zero. Students that miss a scheduled lab or test must contact me within 24 hours of their absence. Otherwise, a grade of zero will be applied to the missed item.

Study Habits

Physics 104 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, and regular (and early) visits check-ins with the instructor.

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 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.