COURSE SYLLABUS

CAMOSUN COLLEGE

COURSE TITLE: PHYS-104: General College Physics 1

CLASS SECTION: 001/001XL

TERM: Fall 2023

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: Stephanie Ingraham

EMAIL: IngrahamS@camosun.ca

OFFICE: Fisher 340C

HOURS: Monday, Wednesday, Thursday, Friday 10:30 – 11:20 am

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 Office Suite available free to students here: https://legacy.camosun.ca/services/its/other-services.html.)

Optional material:

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

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

Lectures:

Monday 11:30 am – 12:20 pm   F310
Wednesday 11:30 am – 12:20 pm   F316
Wednesday 11:30 am – 12:20 pm   F316
Thursday 11:30 am – 12:20 pm   F316
Friday 11:30 am – 12:20 pm   F316

Lab:
Thursday 3:30 pm- 5:20 pm F322

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor. The lecture topics are estimates which vary based on pacing within 1-3 days.

Date	Lectures
WEEK #1	
Monday, Sept. 4th	No Class (Labour Day).
Wednesday, Sept. 6th	Course Intro, 1.1 Measurements, Units, and The S.I. System
Thursday, Sept. 7th	1.2 Scientific Notation and S.I. Prefix Notation

Lab	Lab 1- Data Analysis and Graphing
Friday, Sept. 8th	1.3 Unit Conversions
WEEK #2	
Monday, Sept. 11th	2.1 Vectors and Displacement, 2.2 Speed and Velocity
Wednesday, Sept. 13th	2.3 Acceleration, 2.4 1D Kinematics Problems with Constant Acceleration
Thursday, Sept. 14th	2.5 Applications to Free Fall
Lab	Lab 2- Kinematics in One Dimension
Friday, Sept. 15th	2.5 Applications to Free Fall
WEEK #3	
Monday, Sept. 18st	3.1 Vector Operations- Graphical Approach
Wednesday, Sept. 20th	3.2 Vector Components
Thursday, Sept. 21st	3.3 Vector Operations with Components
Lab	Test 1- Modules 1 and 2
Friday, Sept. 22nd	3.4 Kinematics in 2D
WEEK #4	
Monday, Sept. 25th	3.5 Projectile Motion
Wednesday, Sept. 27th	3.5 Projectile Motion
Thursday, Sept. 28th	4.1 Types of Forces
Lab	Lab 3- Motion in Two Dimensions
Friday, Sept. 29th	4.2 Newton's First Law
WEEK #5	
Monday, Oct. 2nd	No class (National Day for Truth and Reconciliation)
Wednesday, Oct. 4th	4.3 Newton's Second Law
Thursday, Oct. 5th	4.4 Problems Involving Friction
Lab	Lab 4- Mechanical Equilibrium in 2D
Friday, Oct. 6th	4.5 Inclined Planes
WEEK #6	
Monday, Oct. 9th	No class (Thanksgiving)
Wednesday, Oct. 11th	Uncertainties
Thursday, Oct. 12th	Uncertainties
Lab	Lab 5- (Exercise 4) Measurement Uncertainties
Friday, Oct. 13th	4.6 Connected Objects
WEEK #7	
Monday, Oct. 16th	5.1 Kinematics of Uniform Circular Motion
Wednesday Oct. 18th	5.2 Dynamics of Uniform Circular Motion
Thursday Oct. 19th	5.3 Newton's Law of Universal Gravitation
Lab	Test 2- Modules 3 and 4
Friday Oct. 20th	5.4 Gravity and Orbits
WEEK #8	
Monday, Oct. 23rd	6.1 Work
Wednesday Oct. 25th	6.2 The Work-Kinetic Energy Theorem
Thursday Oct. 26th	6.3 Potential Energy
Lab	Lab 6- Atwood's Machine
Friday Oct. 27th	6.4 Conservation of Energy
WEEK #9	
Monday, Oct. 30th	6.5 Conservation of Energy with Non-Conservative Forces
Wednesday Nov. 1st	6.6 Power
Thursday Nov. 2nd	7.1 Temperature and Thermometers
Lab	Lab 7- Centripetal Force
Friday Nov. 3rd	7.2 Thermal Expansion
WEEK #10	
Monday, Nov. 6th	7.3 Heat and Thermal Energy
Wednesday Nov. 8th	7.4 Calorimetry Problems with No Phase Change

Thursday Nov. 9th	7.5 Calorimetry Problems with Phase Change
Lab	**Test 3- Modules 5 and 6**
Friday Nov. 10th	7.6 Mechanisms of Heat Transfer
WEEK #11	
Monday, Nov. 13th	**No Class (Remembrance Day)**
Wednesday Nov. 15th	8.1 Density and Pressure
Thursday Nov. 16th	8.2 Solving Hydrostatics Problems
Lab	**Lab 8- Latent Heat of Vaporization of Water**
Friday Nov. 17th	8.3 Pascal's Principle
WEEK #12	
Monday, Nov. 20th	8.4 Buoyancy and Archimedes' Principle
Wednesday Nov. 22nd	8.5 The Equation of Continuity
Thursday Nov. 23rd	8.6 Elasticity, Stress and Strain
Lab	**Lab 9- Buoyancy and Archimedes' Principle**
Friday Nov. 24th	8.7 Surface Tension and Capillary Action
WEEK #13	
Monday, Nov. 27th	9.1 Impulse, Momentum, and Centre of Mass
Wednesday Nov. 29th	9.2 Conservation of Momentum
Thursday Nov. 30th	9.3 Elastic and Inelastic Collisions
Lab	**Test 4- Modules 7 and 8**
Friday Dec. 1st	9.4 Conservation of Momentum in 2D
WEEK #14	
Monday, Dec. 4th	10.1 Torque
Wednesday Dec. 6th	10.2 The Second Condition of Equilibrium
Thursday Dec. 7th	Review
Lab	Review
Friday Dec. 8th	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 – 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: Thursday, September 21st

Test #2: Thursday, October 19th

Test #3: Thursday, November 9th

Test #4: Thursday, November 30th

The date and location of the final exam will be announced later in the term.

COURSE GUIDELINES & EXPECTATIONS

- Course content, announcements, and important class information will be posted on d2L. Students must check d2L regularly.

- Homework problems will be assigned at the beginning of a particular week and will be due by the end of the day (11:59 PM) on the Friday of the following week. Any submissions after this time will be considered late. See below for late policies. Homework will be marked based on completion.

- Homework can be submitted in person at the end of class or uploaded to the d2L "Assignments" folder.

- Four midterm tests will occur at the dates and times listed above. Out of the four midterm tests, the lowest midterm grade will be dropped for each student, ie. the best three out of four midterm grades will be used to make up the 30% weighting.

- Short, weekly quizzes will be delivered at the end of the lecture on Friday of each week. Quizzes will be closely based on homework problems.

- Labs will take place in the lab period on Thursday of each week. The due date for each lab report will be posted on the d2L calendar. Students must be present in the lab to take their own data. Each student is allowed one dropped or missed lab.

- If a lab or test is missed due to illness or extenuating circumstances, students must contact their lecture or lab instructor within 24 hours of the missed lab or test. Otherwise, the lab or test will be assigned a zero grade.

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 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 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.

<u>PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:</u>

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

- 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.

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.