COURSE SYLLABUS

COURSE TITLE: PHYS-104: General College Physics 1

CLASS SECTION: 001

TERM: W2024

COURSE CREDITS: 3

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: F340C

HOURS: Mon/Tues/Thurs 9:30-10:20 am Wed 11:30 am- 12:20 pm *or by appointment

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:

- 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)
- Physics 104 Lab Manual 2022 edition (Available on d2L as a pdf and as a hardcopy in the Bookstore)

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

Lectures:

Monday	8:30 am – 9:20 am	F322
Tuesday	8:30 am – 9:20 am	F322
Thursday	8:30 am – 9:20 am	F322
Friday	10:30 am – 11:20 am	F322

Lab:

Friday	11:30 am – 1:20 pm	F322

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

Date	Lectures
WEEK #1	
Monday, Jan. 8th	Course Intro, 1.1 Measurements, Units, and The S.I. System
Tuesday, Jan. 9th	1.2 Scientific Notation and S.I. Prefix Notation
Wednesday, Jan. 10th	1.3 Unit Conversions
Friday, Jan. 12th	2.1 Vectors and Displacement, 2.2 Speed and Velocity
Friday, Jan. 12th	**Lab 1- Data Analysis and Graphing**
WEEK #2	

Monday, Jan. 15th	2.3 Acceleration, 2.4 1D Kinematics Problems with Constant Acceleration
Tuesday, Jan. 16th	2.5 Applications to Free Fall
Wednesday, Jan. 17th	2.5 Applications to Free Fall
Friday, Jan. 19th	3.1 Vector Operations- Graphical Approach
Friday, Jan. 19th	**Lab 2- Kinematics in One Dimension**
WEEK #3	
Monday, Jan. 22nd	3.2 Vector Components
Tuesday, Jan. 23rd	3.3 Vector Operations with Components
Wednesday, Jan. 24th	3.4 Kinematics in 2D
Friday, Jan. 26th	3.5 Projectile Motion
Friday, Jan. 26th	**Test 1- Modules 1 and 2**
WEEK #4	
Monday, Jan. 29th	3.5 Projectile Motion
Tuesday, Jan. 30th	4.1 Types of Forces
Wednesday, Jan. 31st	4.2 Newton's First Law
Friday, Feb. 2nd	Uncertainties
Friday, Feb. 2nd	**Lab 3- (Exercise 4) Measurement Uncertainties**
WEEK #5	
Monday, Feb. 5th	4.3 Newton's Second Law
Tuesday, Feb. 6th	4.4 Problems Involving Friction
Wednesday, Feb. 7th	4.5 Inclined Planes
Friday, Feb. 9th	4.6 Connected Objects
Friday, Feb. 9th	**Lab 4- Motion in Two Dimensions**
WEEK #6	
Monday, Feb. 12th	5.1 Kinematics of Uniform Circular Motion
Tuesday, Feb. 13th	5.2 Dynamics of Uniform Circular Motion
Wednesday, Feb. 14th	5.3 Newton's Law of Universal Gravitation
Friday, Feb. 16th	5.4 Gravity and Orbits
Friday, Feb. 16th	**Test 2- Modules 3 and 4**
WEEK #7	
Monday, Feb. 19th	**Reading Week**
Tuesday, Feb. 20th	**Reading Week**
Wednesday, Feb. 21st	**Reading Week**
Friday, Feb. 23rd	**Reading Week**
Friday, Feb. 23rd	**Reading Week**
WEEK #8	
Monday, Feb. 26th	6.1 Work
Tuesday, Feb. 27th	6.2 The Work-Kinetic Energy Theorem
Wednesday, Feb. 28th	6.3 Potential Energy
Friday, Mar. 1st	6.4 Conservation of Energy
Friday, Mar. 1st	**Lab 5- Mechanical Equilibrium in 2D**
WEEK #9	
Monday, Mar. 4th	6.5 Conservation of Energy with Non-Conservative Forces
Tuesday, Mar. 5th	6.6 Power
Wednesday, Mar. 6th	7.1 Temperature and Thermometers
Friday, Mar. 8th	7.2 Thermal Expansion
Friday, Mar. 8th	**Lab 6- Atwood's Machine**
WEEK #10	
Monday, Mar. 11th	7.3 Heat and Thermal Energy
Tuesday, Mar. 12th	7.4 Calorimetry Problems with No Phase Change
Wednesday, Mar. 13th	7.5 Calorimetry Problems with Phase Change
Friday, Mar. 15th	7.6 Mechanisms of Heat Transfer
Friday, Mar. 15th	**Test 3- Modules 5 and 6**

WEEK #11	
Monday, Mar. 18th	8.1 Density and Pressure
Tuesday, Mar. 19th	8.2 Solving Hydrostatics Problems
Wednesday, Mar. 20th	8.3 Pascal's Principle
Friday, Mar. 22nd	8.4 Buoyancy and Archimedes' Principle
Friday, Mar. 22nd	**Lab 7- Centripetal Force**
WEEK #12	
Monday, Mar. 25th	8.5 The Equation of Continuity, 8.6 Elasticity, Stress and Strain
Tuesday, Mar. 26th	8.7 Surface Tension and Capillary Action, 9.1 Impulse, Momentum, and Centre of Mass
Wednesday, Mar. 27th	9.2 Conservation of Momentum
Friday, Mar. 29th	9.3 Conservation of Momentum in 2D
Friday, Mar. 29th	**College closed**
WEEK #13	
Monday, April 1st	**College closed**
Tuesday, April 2nd	10.1 Torque
Wednesday, April 3rd	10.2 The Second Condition of Equilibrium
Friday, April 5th	**Test 4- Modules 7 and 8**
Friday, April 5th	**Lab 8- Latent Heat of Fusion of Water**
WEEK #14	
Monday, April 8th	Review/Lecture catch up
Tuesday, April 9th	Review/Lecture catch up
Wednesday, April 10th	Review
Friday, April 12th	Review
Friday, April 12th	**Lab 9- Buoyancy and Archimedes' Principle**

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: Friday, January 26th

Test #2: Friday, February 16th
Test #3: Friday, March 15th
Test #4: Friday, April 5th
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 Friday 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.

- Any outstanding labs or homework must be submitted prior to the last day of classes.

SCHOOL OR DEPARTMENTAL INFORMATION

PHYSICS AND ASTRONOMY 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.

PHYSICS AND ASTRONOMY 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 events., 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

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.

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.