COURSE SYLLABUS

COURSE TITLE: PHYS-104-General College Physics 1

CLASS SECTION: 001

TERM: 2024F

COURSE CREDITS: 3

DELIVERY METHOD(S): Lecture (Fisher 322; 11:30-12:20 Monday, Thursday (F316), Friday; 1:30-2:20 Tuesday)

Labs (Fisher 322; 10:30-12:20 Wednesday)

Camosun College respectfully acknowledges that our campuses are situated on the territories of the Lək̓ʷəŋən (Songhees and Kosapsum) and WSÁNEĆ peoples. We honour their knowledge and welcome to all students who seek education here.

INSTRUCTOR DETAILS

NAME: Trystyn Berg

EMAIL: bergtr@camosun.ca

OFFICE: Fisher 346D

HOURS: 1PM - 3PM Monday; 10AM-11AM Tuesday and Friday

Please email me if you cannot make these times.

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

CO-REQUISITE(S):

EQUIVALENCIES:

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course a student will be able to:

- Perform addition, subtraction and scalar multiplication of vectors in two-dimensions using graphical and trigonometric techniques.
- Solve technical problems involving kinematics and dynamics of particles in one- and two-dimensions.
  - Define and differentiate between kinematic variables (position, displacement, velocity, speed acceleration).
  - Solve technical kinematics problems involving constant acceleration in one-dimension (horizontal and inclined surfaces, and free fall) and two-dimensions (projectile motion).
  - Describe Newton's Laws and use Free-Body diagrams to represent forces acting on an object.
  - Apply Newton's Laws to solve dynamics problems involving gravitational forces, friction and interacting pairs of objects.
- Apply conservation principles to solve technical problems involving energy and momentum.
  - Solve problems involving the work done by constant forces in one-and two-dimensions using the work-kinetic energy theorem.
  - Use the conservation of energy principle to solve problems involving gravitational potential energy and dissipative forces.
  - Calculate power output and efficiency for simple mechanical systems .
  - Apply the concepts of momentum and impulse to solve problems involving in collisions in one- and two-dimensions.

- Apply kinematics and dynamics concepts to the study of circular, rotational and orbital motion.
    - Use the concept of centripetal acceleration to solve dynamics problems involving objects in uniform circular motion.
    - Describe Newton's Law of Universal Gravitation and use this principle to solve problems involving orbital motion.
    - 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.
- Solve technical problems involving elastic properties of solids and fluid statics and dynamics.
    - Define density, pressure (including gauge pressure), stress, strain and elastic modulus.
    - Characterize and evaluate the variation in pressure with depth in a fluid in hydrostatic equilibrium including applications of Pascal's Principle.
    - Apply Archimedes' principle to evaluate the buoyant force on objects partially or completely immersed in fluids.
    - Solve technical problems involving surface tension and capillary action.
    - Use the equation of continuity and Bernoulli's equation to qualitatively describe aspects and applications of fluids in motion.
- Explore energy transfer by thermal mechanisms through investigations into heat exchange, thermal expansion and calorimetry.
    - Identify common temperature scales and appropriate conversion factors between scales.
    - Solve technical problems involving the thermal expansion of solids and fluids.
    - Define and distinguish between the terms temperature, heat, thermal energy, specific heat capacity and latent heat.
    - Solve technical calorimetry problems including problems involving phase changes of matter.
    - Describe heat transfer by radiation, thermal conduction and convection.
- Analyze, interpret, and report on experimental results in the context of experimental objectives
    - Observe, record, organize and display data in tables, and record sources of error and determine the uncertainty in results.
    - Plot and analyze linear graphs (determine area, slope, intercept, including uncertainties).
    - 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, required

(c) Scientific Calculator (NB: Cell Phone Calculator App CANNOT be used in midterms, final)

(d) Material for solving problems in class (paper + pen/pencil, tablet, etc)

(e) Drawing Set (ruler, protractor, triangle)

(f) 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

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.

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
1 (Sept. 3-6, 2024)	Course Intro, 1.1 Measurements, Units, S.I. system, 1.2 Scientific notation and S.I. prefix notation, 1.3 Unit conversions Lab 1: Data analysis and graphing	
2 (Sept. 9-13, 2024)	2.1 Vectors and Displacement, 2.2 Speed and Velocity, 2.3 Acceleration, 2.4 1D Kinematics with constant acceleration, 2.5 Applications to free fall Lab 2: Kinematics in One Dimension **(ROOM F322)**	
3 (Sept. 16-20, 2024)	3.1—3.3 Vector components and operations, 3.4 Kinematics in 2D Test 1: Modules 1 and 2	
4 (Sept. 23-27, 2024)	3.5 Projectile motion, Uncertainties, 4.1 Types of Forces Lab 3: Measurement Uncertainties	

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
5 (Sept. 30 – Oct. 4, 2024)	4.2 Newton's first law , 4.3 Newton's Second Law, 4.4 Problems involving friction Lab 4: Mechanical Equilibrium in 2D	Monday Sept. 30 – college closed
6 (Oct. 7-11, 2024)	4.5 Inclined planes, 4.6 Connected objects, 5.1 Kinematics of Uniform circular motion, 5.2 Dynamics of Uniform Circular Motion Lab 5: Motion in two dimensions (ROOM F322)	
7 (Oct. 14-18, 2024)	5.3 Newton's law of universal gravitation, 5.4 Gravity and Orbits, 6.1 Work Test 2: Modules 3 and 4	Monday Oct. 14 – college closed
8 (Oct. 21-25, 2024)	6.2 Work-Kinetic Energy Theorem, 6.3 Potential Energy, 6.4 Conservation of Energy, 6.5 Conservation of Energy with non-conservative forces Lab 6: Atwood's machine	
9 (Oct. 28 – Nov. 1, 2024)	6.6 Power, 7.1 Temperature and Thermometers, 7.2 Calorimetry, 7.3 Heat and thermal energy Lab 7: Centripetal Force	
10 (Nov. 4-8, 2024)	7.4 + 7.5 Calorimetry problems with and without phase changes, 7.6 Mechanisms for heat transfer, 8.1 Density and pressure Test 3: Modules 5 and 6	
11 (Nov. 11-15, 2024)	8.2 Solving Hydrostatic problems, 8.3 Pascal's Principle, 8.4 Buoyancy and Archimedes' principle Lab 8: Latent Heat of fusion of water	Monday Nov. 11 – college closed
12 (Nov. 18-22, 2024)	8.5 Equation of continuity, 8.6 Elasticity, Stress, and Strain, 8.7 Surface tension, 9.1 Impulse, momentum, centre of mass, 9.2+9.3 Conservations of momentum (1D and 2D) Lab 9: Buoyancy and Archimedes' principle	
13 (Nov. 25-29, 2024)	10.1 Torque, 10.2 Second condition of equilibrium Test 4: Modules 7 and 8	
14 (Dec. 2-6, 2024)	Lecture catch-up and review	

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
15+16 (Dec. 9-17, 2024)	Final Exam (during college exam period)	

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 can be reviewed on the CAL exams page.
https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Lecture quizzes	5%
Homework problems	5%
Labs	30%
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.

https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf

COURSE GUIDELINES & EXPECTATIONS

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

Cheating on a term test or final exam will be given a grade of zero.

Course content, announcements, and important class information will be posted on the course page of D2L. Students must check D2L regularly.

Students who will miss a quiz, test, or lab session have an obligation to seek out concessions directly from their instructor in a timely manner BEFORE the start of the assignment being missed.

If a lab, quiz or test is missed due to illness or extenuating circumstances, students must contact their instructor within 24 hours of the missed lab or test.

Lecture quizzes will be assigned on D2L the day of the lecture, and due at 11:59 PM the day of the lecture. These quizzes are 5 minutes long with 2 or 3 conceptual questions about the lecture's learning objectives. The top 90% of lecture quizzes will be used in the grading.

Homework problems will be assigned at the beginning of the module, and solutions shared on D2L. It is up to the student to go through the problems on their own, evaluate their success, and ask for assistance if they do not understand. Homework problems will be due at the beginning of the exam for that module, and will be graded based on completion.

There will be a term test after the completion of two modules, for a total of 4 tests. All four tests will be done during the lab period. The best 3 of 4 tests will be used for the final mark.

One late mark (10%) will be removed per day for late homework or lab reports.

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. 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 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 camosun.ca/services.

Support Service	Website
Academic Advising	camosun.ca/services/academic-supports/academic-advising
Accessible Learning	camosun.ca/services/academic-supports/accessible-learning
Counselling	camosun.ca/services/health-and-wellness/counselling-centre
Career Services	camosun.ca/services/co-operative-education-and-career-services
Financial Aid and Awards	camosun.ca/registration-records/financial-aid-awards
Help Centres (Math/English/Science)	camosun.ca/services/academic-supports/help-centres

Support Service	Website
Indigenous Student Support	camosun.ca/programs-courses/iecc/indigenous-student-services
International Student Support	camosun.ca/international
Learning Skills	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills
Library	camosun.ca/services/library
Office of Student Support	camosun.ca/services/office-student-support
Ombudsperson	camosun.ca/services/ombudsperson
Registration	camosun.ca/registration-records/registration
Technology Support	camosun.ca/services/its
Writing Centre	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills

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.