

# COURSE SYLLABUS



COURSE TITLE: PHYS-104: General College Physics 1

CLASS SECTION: 001

TERM: Fall 2021

COURSE CREDITS: 4

DELIVERY METHOD(S): Face to Face

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](#).

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For COVID-19 information please visit <https://camosun.ca/about/covid-19-updates>

*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

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NAME: Nancy McLean

EMAIL: [mcleann@camosun.bc.ca](mailto:mcleann@camosun.bc.ca)

OFFICE: F346B

OFFICE HOURS: Tuesday: 12:30 -1:30 pm

Wednesday, Thursday, Friday: 9:30-10:30 am 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

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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**

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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

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- (a) Texts      Physics, Principles with Applications, 7<sup>th</sup> edition, Douglas C. Giancoli
- (b) Other      Physics 104/105 Laboratory Manual  
Graph paper (must be either 10 lines/inch or millimeter graph paper)

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

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|---------------------|------------------|------------------|------|
| <b>Class Times:</b> | Tuesday          | 9:30 – 11:20 am  | F322 |
|                     | Thursday, Friday | 10:30 – 11:20 am | F322 |
| <b>Lab Times:</b>   | Wednesday        | 10:30 – 12:20 pm | F316 |

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 |
|--------------------|--|-------------|
| Week 1             | Accuracy in measurement & Unit Review                |             |
| Week 2             | 1-D Kinematics                                       |             |
| Week 3             | 2-D Vector mathematics                               |             |
| Week 4             | Vector components & 2-D Kinematics                   |             |
| Week 5             | Newton's 1 <sup>st</sup> & 2 <sup>nd</sup> Laws      |             |
| Week 6             | Dynamics applications & Newton's 3 <sup>rd</sup> Law |             |

| WEEK or DATE RANGE | ACTIVITY or TOPIC  | OTHER NOTES |
|--------------------|--|-------------|
| Week 7             | Kinematics & dynamics of uniform circular motion<br>Universal Law of gravity |             |
| Week 8             | Work-Kinetic Energy theorem, Conservation of energy                          |             |
| Week 9             | Power, Impulse & Momentum  |             |
| Week 10            | Torque & Equilibrium, Stress & Strain  |             |
| Week 11            | Thermal expansion  |             |
| Week 12            | Heat & calorimetry   |             |
| Week 13            | Density & Pressure   |             |
| Week 14            | Fluids   |             |

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 notice is required. Deadlines can 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

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| DESCRIPTION                   | WEIGHTING   |
|-------------------------------|-------------|
| Best 3 out of 4 tests         | 30%         |
| Homework                      | 10%         |
| Lab work (1 drop lab allowed) | 25%         |
| Final exam                    | 35%         |
| <b>TOTAL</b>                  | <b>100%</b> |

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>

## COURSE GUIDELINES & EXPECTATIONS

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### Homework and Labs

Due dates for all material, including assignments, labs, tests, will be available on the course page on D2L, but in general:

- Assignments will be given throughout the term (generally weekly) and will be due by the end of the day (5:00 PM) on the posted Due Date for any particular assignment.
- Labs assigned in a particular week on Wednesday lab period will be due by the end of the lab period the (12:30 PM) on the Wednesday of the next week. (E.g., if Lab #1 occurs during Week #1

Wednesday, it will be due the Wednesday of Week #2, etc.). Exceptions will apply when there are tests during the lab period in which case students will have a designated longer time to work on a lab.

- Students will complete a minimum of 9 laboratory experiments including 1 formal reports (with full uncertainty calculations) and at least at least one lab using technology to perform data analysis.
- 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 labs (or assignments), a late penalty of 10 % per day will be assessed for the first five days following the due date. After this, a completed lab or homework assignment earns a maximum mark of 50%.
- All late homework and lab assignments must be submitted by the last day of the term (5:00 PM on December 10<sup>th</sup>); after this point, outstanding labs & assignments will receive a mark of zero.

### Tests

- Tests and must be completed during the specified synchronous time slot in the lab periods noted on the D2L website throughout the term.
- Students who know in advance that the assigned test time will pose a problem for them (e.g., due to illness or family emergency) must contact me in advance of the test.

### SCHOOL OR DEPARTMENTAL INFORMATION

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- 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.
- Students who are repeating Physics 104 and have a lab mark from the previous attempt at the course greater than 70% can apply for lab exemption and carry over their previous lab mark. Please contact me in the first week of the term with the name of your previous instructor if this applies to you.
- Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.

### STUDENT RESPONSIBILITY

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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

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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                   | <a href="http://camosun.ca/advising">http://camosun.ca/advising</a>                       |
| Accessible Learning                 | <a href="http://camosun.ca/accessible-learning">http://camosun.ca/accessible-learning</a> |
| Counselling                         | <a href="http://camosun.ca/counselling">http://camosun.ca/counselling</a>                 |
| Career Services                     | <a href="http://camosun.ca/coop">http://camosun.ca/coop</a>                               |
| Financial Aid and Awards            | <a href="http://camosun.ca/financialaid">http://camosun.ca/financialaid</a>               |
| Help Centers (Math/English/Science) | <a href="http://camosun.ca/help-centres">http://camosun.ca/help-centres</a>               |
| Indigenous Student Support          | <a href="http://camosun.ca/indigenous">http://camosun.ca/indigenous</a>                   |
| International Student Support       | <a href="http://camosun.ca/international/">http://camosun.ca/international/</a>           |
| Learning Skills                     | <a href="http://camosun.ca/learningskills">http://camosun.ca/learningskills</a>           |
| Library                             | <a href="http://camosun.ca/services/library/">http://camosun.ca/services/library/</a>     |
| Office of Student Support           | <a href="http://camosun.ca/oss">http://camosun.ca/oss</a>                                 |
| Ombudsperson                        | <a href="http://camosun.ca/ombuds">http://camosun.ca/ombuds</a>                           |
| Registration                        | <a href="http://camosun.ca/registration">http://camosun.ca/registration</a>               |
| Technology Support                  | <a href="http://camosun.ca/its">http://camosun.ca/its</a>                                 |
| Writing Centre                      | <a href="http://camosun.ca/writing-centre">http://camosun.ca/writing-centre</a>           |

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

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### 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](http://camosun.ca/services/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](http://camosun.ca/sexual-violence). To contact the Office of Student Support: [oss@camosun.ca](mailto: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.