



CAMOSUN COLLEGE
School of Arts & Science
Department of Physics & Astronomy

PHYS-101-D01
Introduction to Physics
Winter 2021

COURSE OUTLINE

The course description is available on the web @ <http://camosun.ca/learn/calendar/current/web/phys.html>

Ω Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

Instructor Information

Instructor: Nancy McLean
Mon: 10-10:20 am and 11:30-12:20 pm
Office Hours: Tues: 9:00-9:30 am
Thurs: 9:00-9:30 am
Fri: 9:00-9:30 am and 11:30-12:30 pm or by appointment – just email to arrange
Location: Remotely online via D2L (online.camosun.ca)
Phone: N/A
Email: McLeanN@camosun.bc.ca
Website Info: D2L (online.camosun.ca)

2. Intended Learning Outcomes

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

1. Demonstrate skill in the use of S.I. base and derived units.
2. Draw graphs (by hand), determine slopes of linear graphs, linearize non-linear data, and write an equation to represent a linear graph.
3. Solve technical problems involving one-dimensional kinematics for a single particle with constant acceleration.
4. Solve technical problems involving the dynamics of a single particle in one dimension using Newton's Laws of Motion.
5. Perform vector analysis using scaled diagrams with applications to displacement and force.
6. Define the terms work, kinetic energy, gravitational potential energy and power.
7. Solve technical problems using the work-kinetic energy theorem and conservation of mechanical energy.
8. Solve technical problems involving simple DC electric circuits, Ohm's Law, and electric power.
9. Define and describe the following properties of waves: period, frequency, wave speed and amplitude.
10. Define the properties of light, including the electromagnetic spectrum.
11. State and apply the Law of Reflection and the Law of Refraction.
12. Assemble simple experimental apparatus using written instructions.
13. Observe, record, organize and display experimental data in tables, graphs or charts.
14. Analyze linear graphs (determine area, slope, intercept, etc.).
15. Interpret experimental results in the context of the experimental objectives.

3. Required Materials

- (a) Texts Physics 101 Course Materials book – Available on D2L for free **OR** Hardcopy from Camosun bookstore
- (b) Other Scientific calculator, ruler, protractor
Access to a computer with Microsoft Word**
Access to a cellphone, camera or scanner capable of generating PDF documents for submission of homework, labs, tests, etc
Graph paper (**must be either 10 lines/inch or millimeter graph paper**) – I will post a copy of a blank page on D2L

**Word is available as part of the Office 365 suite provided free to all Camosun students. See: <http://camosun.ca/services/its/other-services.html> for details.

4. Course Content and Schedule

This course is designed to be delivered **half Synchronously** and **half Asynchronously**. **Synchronous** meaning that students can access and engage with course content delivery at the set times and days of the week posted on Camlink. These **synchronous** (set time) sessions will be recorded and posted on D2L for students to access & review any time after delivery of the content.

Asynchronous lecture content will consist of a mixture of pre-recorded videos, typed lecture notes/instructions of content to read and learn and examples of problems to complete and learn. Students are encouraged to work through the Asynchronous material, creating notes as if they were participating in a lecture and pausing to work on problems themselves. The time commitment to work through the **asynchronous** lecture content is estimated to take approximately 3.0 hours a week in addition to the Synchronous content and normal study/work time devoted to completing a course.

Labs are set up to be predominantly **Asynchronous**. Most labs consist of a virtual online introductory session delivered via Collaborate during each lab period to guide students through the accompanied material consisting of written instructions/data to analyze/virtual labs to complete. Support for the labs will be available during the two-hour lab period or other office hours noted below. It is estimated that it will take students between 2 to 4 hours to complete each lab. Some office hours will be delivered during the lab Collaborate synchronous sessions. Other office hours will be delivered outside of class/lab times as per the schedule below.

There will be **four synchronous** tests delivered in the lab period throughout the term and students **must be available** to write tests at those times at the dates posted on D2L.

There will be an **asynchronous quiz** delivered **each week** during the lab period that must be completed by the end of the lab period. All synchronous content will be delivered via D2L's Blackboard Collaborate feature.

All times below are specified in terms of Pacific Time (Pacific Daylight Time prior to Nov. 1st; Pacific Standard Time after Nov. 1st)

LECTURE:

Tuesday:	10:30 AM - 11:20 AM	Synchronous Lecture
Wednesday:	Asynchronous Lecture material delivered to complete at a time of your choosing	
Thursday:	10:30 AM – 11:20 AM	Synchronous Lecture
Friday:	Asynchronous Lecture material delivered to complete at a time of your choosing	

LAB:

Monday:	12:30 PM – 1:20 PM	Synchronous Lab/ mandatory test time (on test days)
Monday:	1:20 PM – 2:20 PM	Optional Office hours/ mandatory test time (on test days)

OUTSIDE Class time Office Hours: (Or by appointment)

Monday	10:00 AM – 10:30 AM and 11:30 AM – 12:20 PM
Tuesday & Thursday:	9:00 AM – 9:30 AM
Friday:	9:00 AM – 9:30 AM and 11:30 AM - 12:20 PM

5. Basis of Student Assessment (Weighting)

The student must be successful in both the theory ($\geq 50\%$) and laboratory assignments ($\geq 50\%$) to pass the course. The approximate percentages used for the final grading are:

4 Term tests	30%	(Dates and times will be posted on D2L)
Assignments	22.5%	
Quick Quizzes	7.5%	(During every lab period on Mondays – not Week 1)
Lab Work (1 drop lab allowed)	15%	
Final Exam (3 hours)	25%	

Course Policies - Please carefully read the following course policies.

Homework and Labs

Due dates for all material, including assignments, labs, texts, 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 (11:59 PM) on the posted Due Date for any particular assignment – generally 5 days later.
- Labs assigned in a particular week on Monday lab period will be due by the end of the day (11:59 PM) on the Friday of the same week. (E.g., if Lab #1 occurs during Week #1 Monday, it will be due the Friday of Week #1, 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 can access and work on the labs after the Monday synchronous lab introductory session, with specific support for the labs available during the lab period office hours.
- 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 (11:59 PM on April 17th); after this point, outstanding labs & assignments will receive a mark of zero.
- Students who are repeating Physics 101 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.

Tests

- Tests must be completed during the specified synchronous time slot in the lab periods noted on the D2L website throughout the term and must be submitted by the end of this timeslot; students experiencing any difficulty accessing or completing the test during the specified timeslot must **immediately** contact me for assistance by email (mcleanN@camosun.bc.ca).
- 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.
- Late tests received without a suitable explanation will be assigned a mark of zero.

Submission of Assignments and Tests

- Labs, Assignments and Tests are to be submitted as a **single PDF file - ONLY one file per submission** using the Assignments drop box on D2L. **No Jpeg, Docx, Doc, Bmp or other format types for files will be marked other than PDF.**
- Students are strongly encouraged to ensure that they are comfortable with the submission process prior to the date of first test. Students must budget their test time carefully as the time available for each test includes the time necessary for scanning and uploading of tests. **Test submissions will be subject to late penalties if outside the allowable designated time.**
- In the event of any difficulty submitting assessments to D2L, students can email me their assignment (McleanN@camosun.bc.ca). The same time deadlines will apply to emailed submissions.

Quizzes

- Weekly asynchronous quizzes cover lecture material.
- These quizzes will go live **under the D2L Quiz tool** at the beginning of the Monday lab period (12:30 PM) of a given week and will be available until 2:20 PM of the same lab period. Quizzes can be attempted at any point during this window, but once the quiz has been started, there is a maximum 20-minute time limit.
- Quiz grades and correct quiz answers will be available for review once the cut off time for the week's quiz has passed.

Academic Integrity

- Students in this course are subject to the Camosun College Academic Integrity Policy available at the link below and mirrored on the D2L website.
<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf>
- You should read the above document thoroughly by the end of the first week of classes and be familiar with what constitutes academic misconduct. **Failure to read this document or this course outline is not considered a valid excuse if you are found to have committed academic misconduct!**
- You may also wish to consult the supporting documents on the Process for Documenting and Addressing Academic Misconduct as well as the Guide to Academic Misconduct and How to Address It.
<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.1.pdf>
<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.5.pdf>
- The Academic Integrity Policy and Supporting Documents provide examples of academic dishonesty. Some common examples include:
 - Communicating with classmates or other individuals during tests and quizzes
 - Posting homework, quiz, lab or test material to homework helper sites such as Chegg, Slader, CourseHero, etc...
 - Direct copying from any resources without approval of the instructor (including, but not limited to your classmates' work, online non-D2L resources, lab manual instructions, and an instructor's own posted solutions)
 - Having an individual (classmate, friend, professional tutor) complete work on your behalf
 - Sharing detailed information about tests, quizzes or assignments with students who have not yet taken the test or completed the assignment (In this case, all participating students will be penalized)
 - Copying data taken by another student in an individual lab exercise, or sharing your own data with other students.
 - Submission of any work that is not your own.

All students found to have committed any form of academic misconduct will be assigned an appropriate consequence as outlined in the Academic Integrity Policy.

- Please note that student academic misconduct is documented and kept on record in the Office of the Registrar. Repeated breaches of academic integrity within this course or across courses can lead to more significant consequences per the policy and its supporting documents.
- Students are encouraged to engage with the instructor to discuss any concerns around academic integrity or violations thereof. Should a student and the instructor disagree as to the outcome of a misconduct allegation, then the student may reach out to the department Chair for support.
- I encourage you to reach out to me if you have any questions about academic integrity. You are welcome to consult with other students in working through homework problems and labs, but ultimately your final submitted work must be your own.

Centre for Accessible Learning

- Certain students are eligible for special academic accommodations through the college's Centre for Accessible Learning (CAL). (<http://camosun.ca/services/accessible-learning/>). If you suspect that you are eligible for accommodations, please contact the Centre as soon as possible.

If you have been provided with CAL accommodations, please contact me as early as possible with your letter of accommodations.

Science Help Center

Camosun offers the Science Help center which all students may access for assistance. The hours for the Science help Center are posted on the Camosun webpage along with the links. Below is the link:

<http://camosun.ca/services/help-centres/science-help.html#phys>

The direct link to the Physics Blackboard Collaborate room is the following:

<https://ca.bbcollab.com/collab/ui/session/guest/73edfae741bf4db493a07a75e00ebe06>

6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

STUDY TIME

It is recommended that between 5 and 10 hours per week (or more for students with a weak background) be spent studying for this course outside of class time.

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at camosun.ca.

8. College Supports, Services and Policies



Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts

@ <http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence, Student Ancillary Fees, Academic Integrity, Grade Review & Appeals, Student Misconduct and Academic Accommodations for Students with Disabilities and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at <http://camosun.ca/about/policies/index.html> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

OUTLINE:

1. **Measurement**

- 1.1. Système international d'unités, SI (International System of Units)
 - 1.1.1. Base Units
 - 1.1.2. Prefixes
 - 1.1.3. Derived Units
- 1.2. Dimensional Analysis for unit conversion
- 1.3. Significant Figures
- 1.4. Precision and accuracy
- 1.5. Scientific Notation

2. **Graphical Analysis**

- 2.1. Constructing graphs of linear data
 - 2.1.1. Plotting data
 - 2.1.2. Best-fit line
- 2.2. Analyzing linear graphs
 - 2.2.1. Determination of slope and intercept
 - 2.2.2. The linear equation
- 2.3. Analyzing non-linear graphs
 - 2.3.1. Recognition of power graphs
 - 2.3.2. Changing variables to produce linear graphs
 - 2.3.3. Writing equations for non-linear graphs

3. **Kinematics in One Dimension**

- 3.1. Motion diagrams
- 3.2. Position, distance, displacement
- 3.3. Vector and scalar quantities
- 3.4. Graphs of kinematic quantities
 - 3.4.1. Position versus time
 - 3.4.2. Displacement versus time
- 3.5. Speed and velocity
- 3.6. Accelerated Motion
 - 3.6.1. Definition of acceleration
 - 3.6.2. Graphs of velocity versus time
 - 3.6.3. Kinematic equations of motion with constant acceleration
 - 3.6.4. Acceleration due to Earth's gravity
 - 3.6.5. Vertical motion near the Earth

4. **Dynamics in One Dimension**

- 4.1. Force and accelerated motion
- 4.2. Newton's first law of motion
 - 4.2.1. Concept of inertia
- 4.3. Newton's second law of motion
 - 4.3.1. Applications of Newton's second law of motion
- 4.4. Newton's third law of motion
 - 4.4.1. Interaction forces
 - 4.4.2. Ropes and strings
 - 4.4.3. Normal forces

5. **Vectors in Two Dimensions**

- 5.1. Scaled diagrams for displacements and forces
- 5.2. Vector components in scaled diagrams

6. Work, Energy and Power

- 6.1. Work done by a force
- 6.2. Definition of mechanical power
- 6.3. Types of mechanical energy
 - 6.3.1. Kinetic energy
 - 6.3.2. Gravitational potential energy
 - 6.3.3. Elastic potential energy
- 6.4. Work-Energy theorem
- 6.5. Conservation of mechanical energy

7. Waves

- 7.1. Types of mechanical waves
 - 7.1.1. Periodic Motion
 - 7.1.2. Transverse waves
 - 7.1.3. Longitudinal waves
- 7.2. Properties of mechanical waves
 - 7.2.1. Amplitude
 - 7.2.2. Wave speed
 - 7.2.3. Wavelength
 - 7.2.4. Frequency
 - 7.2.5. Period
 - 7.2.6. Wave Superposition

8. Light

- 8.1. Properties and characteristics
 - 8.1.1. Ray model
 - 8.1.2. Luminous sources and illumination
 - 8.1.3. Opaque, transparent, and translucent materials
- 8.2. Speed of light
- 8.3. Wave model of light and the electromagnetic spectrum
- 8.4. Law of Reflection
 - 8.4.1. Specular and diffuse reflection
 - 8.4.2. Images in plane mirrors
 - 8.4.3. Ray trace diagrams for plane mirrors
- 8.5. Law of Refraction
 - 8.5.1. Snell's Law
 - 8.5.2. Total internal reflection
 - 8.5.3. Dispersion
 - 8.5.4. Ray trace diagrams for converging lens

9. Direct Current Circuits

- 9.1. Definitions
 - 9.1.1. Properties of charge
 - 9.1.2. Electric current
 - 9.1.3. Voltage
 - 9.1.4. Resistance
- 9.2. Ohm's Law
- 9.3. Circuit Diagrams
- 9.4. Electrical energy and power
- 9.5. Resistors in Series
- 9.6. Resistors in Parallel