



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

PHYS-104-D02
General College Physics 1
Fall 2020

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
Tues: 4:30-5:20 pm
Office Hours: Wed: 5:00-5:20 pm and 7:00 – 7:20 pm
Thurs: 4:30-5:20 pm and 7:00 – 7:20 pm
or by appointment
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

(If any changes are made to this part, then the Approved Course Description must also be changed and sent through the approval process.)

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 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, records, 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.

3. Required Materials

- (a) Texts Physics, Principles with Applications, 7th edition, Douglas C. Giancoli
- (b) Other Scientific calculator, ruler, protractor
 Access to a computer with Microsoft Word and Excel**
 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 and Excel are 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 largely delivered **synchronously** (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. Some office hours will be delivered during these synchronous sessions. Other office hours will be delivered outside of class time as per the schedule below.

Asynchronous lecture content will consist of pre-recorded videos, supplemented with typed lecture notes/instructions of content to view and learn. Students are encouraged to work through the videos, taking notes as if they were participating in a lecture and pausing videos to work on problems themselves. The time commitment to work through the asynchronous lectures is estimated to take approximately 2 hours a week.

Labs are set up to be predominantly **synchronous**. Most labs consist of a virtual online introductory session delivered via Collaborate 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.

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:	5:30 PM - 7:20 PM	Synchronous Lecture
Thursday:	5:30 PM – 7:00 PM	Synchronous Lecture
Thursday:	7:00 PM – 7:20 PM	Optional Office hours
Thursday:	Asynchronous material delivered at a time of your choosing	

LAB:

Wednesday:	5:30 PM – 6:20 PM	Synchronous Lab/ mandatory test time (on test days)
Wednesday:	6:20 PM – 7:20 PM	Optional Office hours/mandatory test time (on test days)

OUTSIDE Class time Office Hours: (Or by appointment)

Tuesday & Thursday:	4:30 PM - 5:20 PM
Wednesday:	5:00 PM - 5:20 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:

Best 3 of 4 Term tests	30%	(Dates and times will be posted on D2L)
Assignments	10%	
Quick Quizzes	10%	(During every lab period on Wednesdays)
Lab Work (1 drop lab allowed)	25%	
Final Exam (3 hours)	25%	

Course Requirements - Please carefully read the following:

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 Wednesday lab period will be due by the end of the day (11:59 PM) on the Wednesday of the following 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 can access and work on the labs after the Friday synchronous lab session, with specific support for the labs available during the lab 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 December 12th); after this point, outstanding 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 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 per submission** using the Assignments drop box on D2L.
- 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.
- 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 at the beginning of the Wednesday lab period (5:30 PM) of a given week and will be available until 7:20 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 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 Honesty

- Students in this course are subject to the School of Arts & Science Academic Honesty Guidelines available at the link below and mirrored on the D2L website.

<http://camosun.ca/learn/school/arts-science/images/Arts%20and%20Science%20Academic%20Honesty%20Guidelines.pdf>

- You should read the above document thoroughly by the end of the first week of classes and be familiar with what constitutes academic dishonesty. Failure to read this document is not considered a valid excuse if you are found to have committed academic dishonesty!
- Note that, per the document, all academic dishonesty infractions (including unintentional infractions) are recorded and kept on file with the Arts and Science Office.

- Significant academic honesty infractions can lead to serious grade penalties and potentially ineligibility for scholarships, prizes and bursaries.
- I encourage you to reach out to me if you have any questions about academic honesty. 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.

6. Grading System

(If any changes are made to this part, then the Approved Course description must also be changed and sent through the approval process.)

(Mark with "X" in box below to show appropriate approved grading system – see last page of this template.)

- 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 and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, 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 and Units – REVIEW**
2. **Kinematics in one dimension - REVIEW**
 - 2.1 Displacement
 - 2.2 Average and instantaneous velocity
 - 2.3 Average and instantaneous acceleration
 - 2.4 Equations of uniformly-accelerated motion
 - 2.5 Application to falling bodies
 - 2.6 *OPTIONAL: Review of kinematic graphs*
3. **Kinematics and Vectors in two dimensions**
 - 3.1 Graphical representation of vector algebra
 - 3.2 Vector algebra by trigonometry
 - 3.3 Kinematics in two dimensions
 - 3.4 Projectile motion
 - 3.5 *OPTIONAL; Max. height and Range eq'ns*
4. **Dynamics**
 - 4.1 Introduction to Newton's Laws of Motion
 - 4.2 Mass and Weight
 - 4.3 Types of forces (gravitational, contact, tension; friction)
 - 4.4 Free body diagrams. Concept of net force
 - 4.5 Dynamics in two dimensions; simultaneous forces, inclines
 - 4.6 Connected objects.

5. **Uniform circular motion and gravitation**

- 5.1 Kinematics and dynamics of uniform circular motion
- 5.2 Newton's Universal law of gravitation
- 5.3 Application to circular planetary motion; satellites.
- 5.4 *OPTIONAL: Kepler's laws*

6. **Torque and Equilibrium**

- 6.1 Torque produced by a force
- 6.2 Conditions for equilibrium
- 6.3 Elasticity of materials
- 6.4 Stress and Strain

7. **Work, energy and power**

- 7.1 Work done by a constant force. Net work
- 7.2 Kinetic energy. The Work-Energy Principle
- 7.3 Potential energy (gravitational, spring)
- 7.4 Conservative and Nonconservative forces
- 7.5 Work and Energy in two dimensions and with dissipative forces.
- 7.6 Conservation of mechanical energy
- 7.7 Energy conservation with dissipative forces
- 7.8 Power and efficiency

8. **Momentum**

- 8.1 Momentum and its relation to force
- 8.2 Conservation of momentum
- 8.3 Impulse
- 8.4 Elastic and Inelastic collisions in 1-dimension
- 8.5 Collisions in 2-dimensions

9. **Thermal energy**

- 9.1 Temperature and thermometers
- 9.2 Thermal expansion
- 9.3 Heat as a form of energy; specific heat
- 9.4 Change of state and latent heat; calorimetry
- 9.5 Heat transfer: conduction, convection and radiation
- 9.6 *OPTIONAL: Heat Transfer Applications.*

10. **Fluids**

- 10.1 Pressure; fluid statics and density
- 10.2 Pascal's Principle
- 10.3 Archimedes' Principle and buoyancy
- 10.4 Surface tension and capillary action
- 10.5 Fluids in motion; Equation of continuity
- 10.6 *OPTIONAL: Bernoulli's Principle and applications*