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

PHYS-104-D03
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.*

1. Instructor Information

(a) Instructor	Stephanie Ingraham		
(b) Office hours	M 9:30- 11:20 am, Tu 10:30-11:20 am, W 10:30-11:20 am *or by appointment		
(c) Location	Online through Blackboard Collaborate		
(d) Phone	250-634-8657	**Alternative:**	
(e) E-mail	IngrahamS@camosun.bc.ca		
(f) Website	d2L: online.camosun.ca		

2. Intended Learning Outcomes

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 by Giancoli, 7th Edition (optional)

(b) Other
Scientific calculator, ruler, protractor.
Access to a computer with Microsoft Excel*.
Access to a cellphone, camera or scanner capable of generating pdf documents for submission of homework, labs and tests

*Excel 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 will be delivered mainly **asynchronously** (meaning that students can access and engage with course content at a time of their choosing) with optional **synchronous** (set time) office hours and tutorials delivered as per the schedule below. Asynchronous lecture content will consist of pre-recorded videos, supplemented with typed lecture notes. 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 4 hours a week, just as it would in a regular face-to-face term.

The optional tutorials are designed to allow students to engage with specific problems drawn from the homework. To fully benefit from the tutorials, students should ensure that they've watched the asynchronous lecture content for the portion of the week leading up to the tutorial and at least read through the homework problems.

Labs are also set up to be **asynchronous**. They consist of an introductory video to guide students through the material accompanied by written instructions. Optional support for the labs will be available during the two-hour lab 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 noted below. There will be an asynchronous quiz delivered each week that must be completed by the end of the week. All synchronous content will be delivered via D2L's Blackboard Collaborate feature.

Tests/Lab Office Hours: Monday 9:30 - 11:20 am

Tutorial: Friday 10:30 -11:20 am

Additional Office Hours: Tuesday, Wednesday 10:30 – 11:20 am

Tests are scheduled for the following dates:

Test #1: Monday October 5th, 9:30- 11:20am
Test #2: Monday October 26th, 9:30- 11:20am
Test #3: Monday November 16th, 9:30- 11:20am
Test #4: Monday December 7th, 9:30- 11:20am

5. Basis of Student Assessment (Weighting)

Homework- 10%
Quizzes- 15%
Midterms (best 3 out of 4) - 30%
Labs- 30%
Final Exam- 15%

COURSE SPECIFIC GUIDELINES

- 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 Wednesday of the following week. (E.g. Week #1's HW will be due by the Wednesday of Week #2; Week #2's HW will be due by the Wednesday of Week #3, etc.). Any time after this will be considered late. See below for late expectations. Homework will be marked based on completion.

- Short, multiple choice quizzes will be delivered each week through d2L. Quizzes will be available at the beginning of the week, and must be completed by Friday at 11:59 PM. Other than for Quiz 1, once you open a quiz, you will have 20 minutes to complete it. You will be allowed one attempt to complete the quiz. Quizzes will be based on lecture content. Each student is allowed one "dropped" or "missed" quiz.

- Quiz 1 is an introductory quiz to familiarize students with course expectations. It has no time limited and allows for multiple attempts.

- 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.

- The lab for each week will be posted on Monday morning. It will be due by 11:59 pm the following Monday. Any changes in due dates or timelines will be posted on the D2L calendar. Any labs that are not completed will be assigned a zero grade.

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 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 such as medical issues or a documented illness.

- Any outstanding homework or labs must be submitted prior to the final exam date, and will be graded according to the late expectations outlined by the instructor.

- Refer to your instructor's information page for any additional expectations regarding testing and grade calculation.

PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:

- 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 (or assignments), a late penalty of 1 mark per day (10%) will be assessed for the first five days following the due date. After this date a complete report is still required and earns a maximum mark of 50%.

- 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.

6. Grading System

[X] Standard Grading System (GPA)

[ ] Competency Based Grading System

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

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	*Incomplete*: 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	*In progress*: 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	*Compulsory Withdrawal*: 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.

Tentative Class Schedule

Date	Lectures	Quiz/Test/Lab/BBC (Office Hours)
WEEK #1		
Monday, Sept. 7th	No Class (Labour Day)	
Tuesday, Sept. 8th	Course Introduction Video	10:30- 11:20 am Office Hours
Wednesday, Sept. 9th	1.1 Measurements, Units, and The S.I. System	10:30- 11:20 am Office Hours
Thursday, Sept. 10th	1.2 Scientific Notation and S.I. Prefix Notation	
Friday, Sept. 11th	1.3 Unit Conversions	10:30-11:20 am Tutorial Quiz 1 Due
WEEK #2		
Monday, Sept. 14th		9:30-11:20 am Lab 1- Data Analysis and Graphing
Tuesday, Sept. 15th	2.1 Vectors and Displacement	10:30- 11:20 am Office Hours
Wednesday, Sept. 16th	2.2 Speed and Velocity	10:30- 11:20 am Office Hours
Thursday, Sept. 17th	2.3 Acceleration	Add/Drop Deadline
Friday, Sept. 18th	2.4 1D Kinematics Problems with Constant Acceleration	10:30-11:20 am Tutorial Quiz 2 Due
WEEK #3		
Monday, Sept. 21st		9:30-11:20 am Lab 2- Free Fall
Tuesday, Sept. 22nd	2.5 Applications to Free Fall	10:30- 11:20 am Office Hours
Wednesday, Sept. 23rd	3.1 Vector Operations- Graphical Approach	10:30- 11:20 am Office Hours
Thursday, Sept. 24th	3.2 Vector Components	
Friday, Sept. 25th	3.3 Vector Operations with Components	10:30-11:20 am Tutorial Quiz 3 Due
WEEK #4		
Monday, Sept. 28th		9:30-11:20 am Lab 3- Mechanical Equilibrium
Tuesday, Sept. 29th	3.4 Kinematics in 2D	10:30- 11:20 am Office Hours
Wednesday, Sept. 30th	3.5 Projectile Motion	10:30- 11:20 am Office Hours
Thursday, Oct. 1st	3.5 Projectile Motion	
Friday, Oct. 2nd	4.1 Types of Forces	10:30-11:20 am Tutorial Quiz 4 Due
WEEK #5		
Monday, Oct. 5th		9:30-11:20 am Test 1- Modules 1, 2, 3.1-3.3
Tuesday, Oct. 6th	4.2 Newton's First Law	10:30- 11:20 am Office Hours

Wednesday, Oct. 7th	4.3 Newton's Second Law	10:30- 11:20 am Office Hours
Thursday, Oct. 8th	4.4 Problems Involving Friction	
Friday, Oct. 9th	4.5 Inclined Planes	10:30-11:20 am Tutorial Quiz 5 Due
WEEK #6		
Monday, Oct. 12th	**No class (Thanksgiving)**	
Tuesday, Oct. 13th	4.6 Connected Objects	10:30- 11:20 am Office Hours
Wednesday, Oct. 14th	5.1 Kinematics of Uniform Circular Motion	10:30- 11:20 am Office Hours
Thursday, Oct. 15th	5.2 Dynamics of Uniform Circular Motion	
Friday, Oct. 16th	5.3 Newton's Law of Universal Gravitation	10:30-11:20 am Tutorial Quiz 6 Due
WEEK #7		
Monday, Oct. 19th		9:30-11:20 am Lab 4- Uncertainties
Tuesday, Oct. 20th	5.4 Gravity and Orbits	10:30- 11:20 am Office Hours
Wednesday Oct. 21st	6.1 Work	10:30- 11:20 am Office Hours
Thursday Oct. 22nd	6.2 The Work-Kinetic Energy Theorem	
Friday Oct. 23rd	6.3 Potential Energy	10:30-11:20 am Tutorial Quiz 7 Due
WEEK #8		
Monday, Oct. 26th		9:30-11:20 am Test 2- Modules 3.4, 3.5, Module 4
Tuesday, Oct. 27th	6.4 Conservation of Energy	10:30- 11:20 am Office Hours
Wednesday Oct. 28th	6.5 Conservation of Energy with Non-Conservative Forces	10:30- 11:20 am Office Hours
Thursday Oct. 29th	6.6 Power	
Friday Oct. 30th	7.1 Temperature and Thermometers	10:30-11:20 am Tutorial Quiz 8 Due
WEEK #9		
Monday, Nov. 2nd		9:30-11:20 am Lab 5- Atwood's Machine
Tuesday, Nov. 3rd	7.2 Thermal Expansion	10:30- 11:20 am Office Hours
Wednesday Nov. 4th	7.3 Heat and Thermal Energy	10:30- 11:20 am Office Hours
Thursday Nov. 5th	7.4 Calorimetry Problems with No Phase Change	
Friday Nov. 6th	7.5 Calorimetry Problems with Phase Change	10:30-11:20 am Tutorial Quiz 9 Due
WEEK #10		
Monday, Nov. 9th		9:30-11:20 am Lab 6- Latent Heat of Fusion
Tuesday, Nov. 10th	7.6 Mechanisms of Heat Transfer	10:30- 11:20 am Office Hours
Wednesday Nov. 11th	**No Class (Remembrance Day)**	10:30- 11:20 am Office Hours
Thursday Nov. 12th	8.1 Density and Pressure	
Friday Nov. 13th	8.2 Solving Hydrostatics Problems	10:30-11:20 am Tutorial Quiz 10 Due
WEEK #11		
Monday, Nov. 16th		9:30-11:20 am Test 3- Modules 5 and 6
Tuesday, Nov. 17th	8.3 Pascal's Principle	10:30- 11:20 am Office Hours
Wednesday Nov. 18th	8.4 Buoyancy and Archimedes' Principle	10:30- 11:20 am Office Hours
Thursday Nov. 19th	8.5 The Equation of Continuity	
Friday Nov. 20th	8.6 Elasticity, Stress and Strain	10:30-11:20 am Tutorial Quiz 11 Due
WEEK #12		
Monday, Nov. 23rd		9:30-11:20 am Lab 7- Buoyancy

Tuesday, Nov. 24th	8.7 Surface Tension and Capillary Action	10:30- 11:20 am Office Hours
Wednesday Nov. 25th	9.1 Impulse, Momentum, and Centre of Mass	10:30- 11:20 am Office Hours
Thursday Nov. 26th	9.2 Conservation of Momentum	
Friday Nov. 27th	9.3 Elastic and Inelastic Collisions	10:30-11:20 am Tutorial Quiz 12 Due
WEEK #13		
Monday, Nov. 30th		9:30-11:20 am Lab 8- Conservation of Momentum
Tuesday, Dec. 1st	9.4 Conservation of Momentum in 2D	10:30- 11:20 am Office Hours
Wednesday Dec. 2nd	10.1 Angular Quantities	10:30- 11:20 am Office Hours
Thursday Dec. 3rd	10.2 Torque	
Friday Dec. 4th	10.3 The Second Condition of Equilibrium	10:30-11:20 am Tutorial Quiz 13 Due
WEEK #14		
Monday, Dec. 7th		9:30-11:20 am Test 4- Modules 7 and 8
Tuesday, Dec. 8th	Review	10:30- 11:20 am Office Hours
Wednesday Dec. 9th	Review	10:30- 11:20 am Office Hours
Thursday Dec. 10th	Review	
Friday Dec. 11th	Review	10:30-11:20 am Tutorial Quiz 14 Due