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

PHYS-141-002
Physics for Science/ENGR 2
Winter 2021

COURSE OUTLINE

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

 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.

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1. Instructor Information

(a) Instructor	Stephanie Ingraham		
(b) Office hours	11:30am- 12:30pm Mon, Tues, Wed, Thurs *or by appointment		
(c) Location	Collaborate (D2L)		
(d) Phone	250-634-8657 (please email first)	**Alternative:**	
(e) E-mail	IngrahamS@camosun.bc.ca		
(f) Website	D2L (online.camosun.ca)		

2. Intended Learning Outcomes

Upon completion of the course the student will be able to:

1. Examine common physical systems subject to periodic motion and study the propagation of waves on strings and in air columns.
    a. Identify defining features of systems undergoing Simple Harmonic Motion and solve technical problems for such systems.
    b. Define and describe the following properties of waves: period, frequency, wave speed, and amplitude.
    c. State the principal of superposition and understand the properties of waves undergoing constructive and destructive interference.
    d. Compare and contrast wave propagation on strings and in air columns including wave speed dependence on medium characteristics.
    e. Solve problems involving the Doppler effect.
    f. State the conditions for standing waves and identify nodes and anti-nodes. Solve problems of vibrating strings and air columns, including fundamental nodes and harmonics.

2. Investigate laws of geometric optics and use them to understand and characterize image formation in mirrors and lenses.
    a. State laws of reflection and refraction and apply laws to calculate paths of light rays at interfaces between materials.
    b. Solve technical problems involving dispersion and total internal reflection as special applications of refraction.
    c. Solve technical problems involving image formation with spherical mirrors, lenses and simple optical devices, including ray diagrams.

3. Apply the wave model of light to study and describe physics optics experiments involving interference and diffraction of light.
    a. Solve technical problems associated with the effects of light interference.

b. Study experiments and applications that rely on interference of light including Young's double-slit, diffraction gratings, thin film interference and the Michelson Interferometer.

c. State and explore the First and Second Laws of Thermodynamics through investigations into heat transfer, calorimetry and analyses of heat engines.
Solve technical problems involving linear and volume expansion of solids and liquids in response to temperature changes.
d. Apply concepts of specific and latent heat to solve technical calorimetry problems including systems undergoing phase changes.
e. Describe fundamental mechanisms of heat transfer.
f. Apply the Ideal Gas Law and the First Law of Thermodynamics to analyze simple heat engines.
g. Apply the concept of entropy and the Second Law of Thermodynamics to describe limits to the efficiency of heat engines.

4. Examine and solve problems using key theories of modern physics including relativity, the structure of matter, and radioactivity.
   a. Outline the key principles of Einstein's Theory of Special Relativity. Solve technical problems involving coordinate transformations, relativity of length and time intervals, relativistic energy and momentum.
   b. Outline key ideas of quantum theory including wave-particle duality and the Heisenberg uncertainty principle.
   c. Solve technical problems involving the photoelectric effect, Compton scattering and pair production and the Heisenberg Uncertainty Principle.
   d. Describe the Bohr model of the atom and the nature of radioactivity.

5. Examine the validity of key physical principles through the use of practical experimental techniques.
   a. Assemble experimental apparatus using written instructions.
   b. Observe and record data including sources of error and estimate the range of uncertainty in results.
   c. Interpret meaning of experimental results in the context of the experimental objectives.
   d. Write scientific reports in correct format.

3. Required Materials

(a) Texts
Physics for Scientists and Engineers, *4th Edition*, Knight, R.D. (Optional)

(b) Other
Scientific calculator, ruler
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) lab sessions 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 sessions noted below.

There will be **three 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	8:30 – 10:20 am
Tutorial:	Friday	10:30 -11:20 am

Tests are scheduled for the following dates:

Test #1: Monday February 1st, 8:30- 10:30am
Test #2: Monday March 1st, 8:30- 10:30am
Test #3: Monday March 29th, 8:30- 10:30am

5. Basis of Student Assessment (Weighting)

Homework- 10%
Quizzes- 15%
Midterms- 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.x. 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.). Homework will be marked based on completion.
- 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 described below.
- I ask that you complete homework and test problems using the notation, formulas and techniques introduced in the lectures. A full formula sheet for the course is available on D2L**. Failure to do so will result in problems being awarded a grade of zero.**
- 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 25 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 policies. It has no time limit and allows for multiple attempts.

- Three mandatory midterm tests will occur at the dates and times listed above. You will have 2 hours to complete each test. Tests submitted after the end of the test time will be subject to late marks. Tests submitted within the first 15 minutes after the deadline will be subject to a deduction of 20%. After each increment of 15 minutes after the test time, the deduction will increase by an additional 20%.

- Tests must be submitted through the d2L Assignments tool. Students are strongly encouraged to ensure that they are comfortable with the submission process prior to the date of the first test. It is the responsibility of the student to ensure that all of their test work is submitted during the test time. Questions or pages that are missing due to scanning errors will not be accepted at a later time.

- The lab for each week will be posted on Monday morning. It will be due by 11:59 pm on Friday of the following week. 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.

- There will be a three hour, cumulative final exam written in the exam period.

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 by the last day of classes (April 16th), and will be graded according to the late protocols outlined by the instructor.

- Refer to your instructor's information page for any additional guidelines 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.

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.

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, 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	*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.