CAMOSUN COLLEGE	***School of Arts & Science*** ***PHYSICS DEPARTMENT*** **PHYS 141-001** **Physics for Scientists and Engineers 2** **Summer 2017**

COURSE OUTLINE

The Approved Course Description is available on the web @
http://camosun.ca/learn/calendar/current/web/phys.html

- *Please note: this outline will be electronically stored for five (5) years only. It is strongly recommended students keep this outline for your records.*

1. Instructor Information

(a)	Instructor:	Christopher Avis		
(b)	Office Hours:	Mon., Wed., Fri.: 11:30 AM -12:20 PM, Tue., Thu.: 10:30 -11:20 AM		
	Location:	Fisher 346D		
(d)	Phone:	250-370-3460	Alternative Phone:	N/A
(e)	Email:	avisc@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.

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

5. 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.

6. 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 University Physics, *14th edition*, Young, H.D., and Freeman, R.A
(b) Other Physics 140/141 Laboratory Manual
Graph paper (must be either 10 lines/inch or millimeter graph paper)

4. Course Content and Schedule

Monday, Wednesday, Friday	Lecture: 12:30 PM – 2:20 PM	Fisher 322
Tuesday, Thursday	Lecture: 11:30 AM – 12:20 PM,	Fisher 322
	Lab: 12:30 PM – 2:20 PM,	Fisher 322

5. Basis of Student Assessment (Weighting)

(a) Homework: 10 %
(b) Lecture Summary Points 5 %
(c) Lab Reports: 15 %
(3 Formal reports @ 3% each + best 5 out of 6 "Activities" @ 1.2 % each)
(d) Term Tests: 30 %

Students have the option between the following configurations of the remaining 40 % of their mark:

(e) Final Exam:	40 %	OR	(e) Lecture Presentation:	10 %
			(f) Final Exam:	30 %

Term tests will be held in the lab period on May 18th, May 30th and June 13th.

Notes about Student Assessment

1. Homework problems for a particular week will cover up to whatever section is finished on the last lecture of that week. They will be due at the end of the day on the following Tuesday and marked.

2. Lecture summary points are a list of the top three ideas presented in each lecture. These are due into the instructor by the start of the following day's lecture. These will be graded for completion only.

3. Labs for a particular week will be due by the end of the day one week following the lab. Students must attend labs to get their data and **must obtain a mark of 50 % or greater in the lab portion of the course to pass the course.**

4. Students have the option of delivering a short, 20 minute lecture on a self contained topic in the course and will be delivered at a pre-arranged time in the last two weeks of the course. Lectures can be chosen from the following topics:

   The Torsional Pendulum
   Damped and Forced Oscillations and Resonance
   Beats
   Dispersion
   Spherical and Chromatic Aberration
   The Telescope
   The Microscope
   Diffraction Gratings

   Any student interested in choosing this grading option, must notify me by the end of the first week of classes so that appropriate scheduling arrangements can be made.

5. Any outstanding assignments or reports must be submitted by the final exam and will be graded per the late policy outlined by the instructor

6. Missed tests and labs will only be excused if I am contacted within 24 hours of the absence and with proper supporting documentation provided (counselor's note, doctor's note, etc...). Otherwise, a mark of zero will be assigned.

PHYSICS DEPARTMENT POLICIES REGARDING TESTING:

1. The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar on page 39, “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.

2. 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.

PHYSICS DEPARTMENT POLICIES REGARDING LABS:

1. Lab attendance is mandatory – you cannot complete a lab using someone else’s data and you may be required to “sign in” at the beginning of each lab period. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances. If you will be absent from a lab period due to illness it is your responsibility to notify your instructor.

2. 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 earns a maximum mark of 50%.

3. At the discretion of the instructor, a student who is repeating this Physics course may apply for lab exemption.

6. Grading System

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	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

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 E-1.5 at **camosun.ca** 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, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)*
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.

7. Recommended Materials or Services to Assist Students to Succeed

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.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html