



School of Arts & Science
PHYSICS DEPARTMENT
PHYS 114-02
Fundamentals of Physics 1
2006F

COURSE OUTLINE

The Approved Course Description is available on the web @ _____

Ω 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:	Elizabeth Ploughman		
(b)	Office Hours:	Mon, Wed, Fri. 12:30-1:20 Tues. 1:30 –2:20 Thurs. 5:30 -6:20		
(c)	Location:	F 314B		
(d)	Phone:	370 3517 please DO leave a voicemail message it will be received and responded to promptly	Alternative Phone:	
(e)	Email:			
(f)	Website:			

DO Not leave email messages as they will not be received until I check my emails from my office. Let me repeat that, important info. is to be left in my voicemail which I check throughout the day.

If you wish to see me at other times you are free to knock on my office door, if I'm not too busy I will be happy to assist you. If you know in advance that you will need help at a non official time then see me to make an appointment.

2. Intended Learning Outcomes

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

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

1. Define and describe the following properties of waves: period, frequency, wave speed, and amplitude. State the principal of superposition and understand the properties of waves undergoing constructive and destructive interference.
2. 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.
3. Solve technical problems involving the behavior of light at an interface between media (laws of reflection, refraction, dispersion).
4. Solve technical problems involving geometric optics (lenses, mirrors, simple optic devices).
5. Solve technical problems associated with the effects of light interference, including Young's double-slit, diffraction gratings, spectral analysis and thin films.

6. Demonstrate proficiency in solving vector algebra problems, including coordinate system conversions, use of unit vectors, vector addition, dot product, and cross product.
7. Solve technical problems involving particle kinematics and dynamics with non-constant force using calculus in two and three dimensions.
8. Provide descriptions of early atomic models and/or the twentieth century experiments that lead to the modern quantum theory of the atom.
9. Solve technical problems involving photoelectric effect, atomic spectra, and energy levels in atoms.
10. Solve technical problems involving properties of the nucleus, radioactivity and nuclear energy.

3. Required Materials

(a)	Texts	Physics for Scientists & Engineers with Modern Physics, 6 th edition, Serway, R.A., and Jewett, J.W.Jr. Physics 114/115 lab manual
(b)	Other	Graph paper (must be either 10 lines/inch or millimeter graph paper)

4. Course Content and Schedule

(Can include: class hours, lab hours, out of class requirements and/or dates for quizzes, exams, lectures, labs, seminars, practicums, etc.)

CREDIT: 4
 IN-CLASS WORKLOAD: 4 lecture, 2 lab (Semester)
 PREREQUISITES: Physics 12 with a "C" or higher or Physics 104 or Physics 151 with a "B" or higher
 COREQUISITES: Math 100

OUTLINE:

1. **Nature of Light and Geometric Optics (Chapter 35.1 – 35.5, 35.7 & 35.8)**

- 1.1 Nature of light
- 1.2 Measurements of the speed of light
- 1.3 Ray approximation in geometric optics
- 1.4 Reflection
- 1.5 Refraction
- 1.6 Dispersion and Prisms
- 1.7 Total Internal Reflection and applications

2. **Image Formation (Chapter 36)**

- 2.1 Images formed by flat mirrors
- 2.2 Images formed by spherical mirrors
- 2.3 Images formed by refraction
- 2.4 Thin Lenses; combinations of thin lenses
- 2.5 Lens aberrations
- 2.6 Selected Optical systems

3. **Wave Motion (Chapter 16.1 – 16.4)**

- 3.1 Propagation of a Disturbance
- 3.2 Sinusoidal Waves (omit sinusoidal waves on a string)
- 3.3 Speed of waves on strings

3.4 Reflection and Transmission

4. **Superposition and Standing Waves (Chapter 18.1 – 18.3, 18.5 & 18.7)**

- 4.1 Superposition and Interference (omit sound waves)
- 4.2 Standing waves in a string
- 4.3 Standing waves in air columns
- 4.4 Beats: Interference in time

5. **Interference of Light Waves (Chapter 37.1, 37.2, 37.6)**

- 5.1 Conditions for interference
- 5.2 Young's double-slit experiment
- 5.3 Interference in thin films

6. **Introduction to Quantum Physics (Chapter 40.1, 40.2 and Chapter 42.1-42.3)**

- 6.1 Blackbody radiation and Planck's hypothesis
- 6.2 The photoelectric effect
- 6.3 Atomic Spectra of Gases
- 6.4 Early models of the atom
- 6.5 Bohr's model of the Hydrogen atom

7. **Nuclear Structure (Chapter 44.1, 44.5 – 44.7 and Chapter 45.1 – 45.4)**

- 7.1 Some properties of nuclei
- 7.2 Radioactivity
- 7.3 Qualitative discussion of decay processes
- 7.4 Nuclear Energy
 - 7.4.1 Nuclear fission
 - 7.4.2 Nuclear reactors
 - 7.4.3 Nuclear fusion
 - 7.4.4 Fusion technology

8. **Vectors (Chapter 3) and Vector Mathematics (Sections 7.3, 11.1)**

- 8.1 Co-ordinate systems
- 8.2 Vector and scalar quantities
- 8.3 Properties of vectors
- 8.4 Components of a vector and unit vectors
- 8.5 Scalar (dot) product – Section 7.3
- 8.6 Vector (cross) product – Section 11.1

9. **Motion in One-Dimension (Chapter 2)**

- 9.1 Position, velocity and speed
- 9.2 Instantaneous velocity and acceleration.
- 9.3 Motion diagrams
- 9.4 1-D motion with constant acceleration
- 9.5 Kinematic equations derived from calculus

10. **Motion in Two and Three Dimensions (Chapter 4.1 – 4.3)**

- 10.1 Position, velocity and acceleration vectors
- 10.2 Two-dimensional motion with constant acceleration
- 10.3 Projectile motion

11. The Laws of Motion (Chapter 5)

- 11.1 Concept of force and Newton's First law
- 11.2 Newton's second law of motion, applications with and with friction
- 11.3 Newton's third law of motion

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

Final Exam	50%
Midterms and other work	35%
Lab Reports	15%
	100%

This distribution may be amended by the instructor (see your Instructor's Information sheet).

A)Tests will be chapter tests for all classes. At least 5 days notice will be given for each test and a brief review will be conducted

The worst test will be dropped to allow for the fact **that no makeup tests** will be given unless medical documentation is provided by the student

B)LABS the worst lab will be dropped but all other labs must be completed .Makeup labs are not usually allowed unless there is a documented medical reason. All labs must be submitted together every week, one week after the experiment is completed. Late labs will be heavily penalized.

C)Assignments will occasionally be given to be completed during class time with a partner. These marks will be added to the lab mark total. Other homework is for the student's practice only

6. Grading System

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
95-100	A+		9
90-94	A		8
85-89	A-		7
80-84	B+		6
75-79	B		5
70-74	B-		4
65-69	C+		3
60-64	C		2
50-59	D		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 at camosun.ca or 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.

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.

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

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.

Note that there will be NO help available after the 2:30 class on Mon or Tuesday so please see me BEFORE or save the question until the next day

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. Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test or provide a make-up test only in the event of documented illness or other extenuating circumstances.
3. Refer to your instructor's information page for any additional policies regarding testing and grade calculation.

DEPARTMENT POLICIES REGARDING LABS:

1. All assigned laboratory exercises and reports must be completed with an overall grade of 60% in order to obtain credit for this course. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances.
2. At the discretion of the instructor, a student who is repeating this Physics course may apply for lab exemption.

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.