CAMOSUN COLLEGE	**School of Arts & Science** **PHYSICS DEPARTMENT** **PHYS 115-001** **Fundamentals of Physics 2** **Winter 2013**

COURSE OUTLINE

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

Ω *Please note: the College electronically stores this outline for five (5) years only.*
*It is **strongly recommended** you keep a copy of this outline with your academic records.*
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

1. Instructor Information

(a)	Instructor:	Ed Nelson		
(b)	Office Hours:	M 2:30-3:30; TWThF 11:30-12:30		
(c)	Location:	FISHER 346C		
(d)	Phone:	250-370-3515	Alternative Phone:	
(e)	Email:	nelson@camosun.bc.ca		
(f)	Website:			

2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

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

1. Solve technical problems for systems undergoing Simple Harmonic Motion.
2. 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.
3. 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.
4. Solve technical problems involving thermometry, thermal expansion, specific heat and calorimetry, equivalence of work and heat, First Law of Thermodynamics, Heat Engines and the Second Law of Thermodynamics, entropy.
5. Solve technical problems involving the behavior of light at an interface between media (laws of reflection, refraction, dispersion).
6. Solve technical problems involving geometric optics (lenses, mirrors, simple optic devices).
7. Solve technical problems associated with the effects of light interference, including Young's double-slit, diffraction gratings, spectral analysis and thin films.
8. Solve technical problems involving forces between electric charges, electric field due to point charges and one-dimensional charge distributions, motion of charged particles in electric fields, the electric potential and electric potential energy.
9. Solve technical problems for multi-branch direct current circuits, including current, resistance, equivalent resistance, power, and Kirchhoff's Rules.
10. Solve technical problems involving magnetic fields and forces, motion of charged particles in magnetic fields, magnetic forces on current-carrying wires and loops, and the Hall effect.
11. Provide descriptions of early atomic models and/or the twentieth century experiments that lead to the modern quantum theory of the atom.
12. Solve technical problems involving photoelectric effect, atomic spectra, and energy levels in atoms.
13. Solve technical problems involving properties of the nucleus, radioactivity and nuclear energy.
14. Assemble experimental apparatus using written instructions.
15. Observe, record, organize and display data in tables, graphs or charts.

16. Analyze linear graphs (determine area, slope, intercept, etc.).
17. Observe and record sources of error and estimate the range of uncertainty in results.
18. Interpret meaning of experimental results in the context of the experimental objectives.
19. Write scientific reports in correct format.

3. Required Materials

(a) Texts — Physicsfor Scientists & Engineers with Modern Physics, , *8th edition*, Serway, R.A., and Jewett, J.W.Jr.

(b) Other — Physics 114/115 Laboratory Manual
Graph paper (must be either 10 lines/inch or millimeter graph paper)

4. Course Content and Schedule

LEC T 2:30 – 3:20 F316; T 2:30 – 4:20 F316; F 2:30 – 3:20 F EWING 344
LAB Th 2:30 – 4:20 F316

5. Basis of Student Assessment (Weighting)

(a) Final Exam 50%

(b) Quizzes 5%

(c) Homework 5%

(d) Midterms 25% (4 scheduled; top 3 of 4 will be counted)

(e) Lab Reports 15%

Refer to your instructor's information for any additional comments regarding grading.

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.

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

PHYSICS DEPARTMENT POLICIES REGARDING LABS:

1. All assigned laboratory exercises and reports must be completed and handed in prior to the date of the final exam with an overall grade of 60% in order to obtain credit for the course.

2. Attendance is mandatory & 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.

3. 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%.

4. 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

OUTLINE:

1. **Oscillatory Motion (Ref. Chpt. 15)**
   - 1.1 Simple Harmonic Motion
   - 1.2 Energy of Simple Harmonic Motion
   - 1.3 Relation between SHM and UCM
   - 1.4 The Pendulum
   - 1.5 Damped and Forced Oscillations

2. **Wave Motion (Ref. Chpt. 16 and17)**
   - 2.1 Propagation of a Disturbance
   - 2.2 Sinusoidal Waves
   - 2.3 Speed of Waves on a String
   - 2.4 Reflection and Transmission
   - 2.5 Sound Waves

3. **Superposition and Standing Waves (Ref. Chpt. 18)**
   - 3.1 Superposition and Interference
   - 3.2 Standing Waves on a String
   - 3.3 Standing Waves in Air Columns
   - 3.4 Beats

4. **Thermodynamics (Ref. Chpt. 19, 20 and 22)**
   - 4.1 Temperature, Thermometers, Thermal Expansion
   - 4.2 Specific Heat and Calorimetry
   - 4.3 Work and Heat (First Law of Thermodynamics)
   - 4.4 Heat Transfer Mechanisms
   - 4.5 Heat Engines and The Second Law of Thermodynamics
   - 4.6 Entropy

5. **Geometric Optics (Ref. Chpt. 35)**
   - 5.1 Nature of Light
   - 5.2 Reflection and Refraction of Light Rays
   - 5.3 Dispersion
   - 5.4 Total Internal Reflection

6. **Image Formation (Ref. Chpt. 36)**
   - 6.1 Images Formed by Flat and Spherical Mirrors
   - 6.2 Images Formed by Refraction
   - 6.3 Images Formed by Thin Lenses
   - 6.4 Lens Aberrations

6.5 Selected Lens Combinations

7. **Electric Field and Potential (Ref. Chpt. 23 and 25)**
   - 7.1 Properties of Electric Charges
   - 7.2 Coulomb's Law
   - 7.3 The Electric Field and Electric Field Lines
   - 7.4 Electric Field Due to Charge Distributions (one dimension)
   - 7.5 Motion of Charged Particles in Electric Fields
   - 7.6 Electric Potential and Potential Difference
   - 7.7 Electric Potential and Potential Energy from Point Charges

8. **Current and DC Circuits (Ref. Chpt. 27 and 28)**
   - 8.1 Electric Current and Resistance
   - 8.2 Electrical Power
   - 8.3 Electromotive Force
   - 8.4 Resistors in Series, Parallel and Combinations
   - 8.5 Kirchhoff's Rules

9. **Magnetic Fields (Ref. Chpt. 29)**
   - 9.1 Magnetic Fields and Forces
   - 9.2 Motion of Charged Particles in Magnetic Fields
   - 9.3 Magnetic Force on Current-Carrying Conductors
   - 9.4 Torque on a Current-Carrying Loop in Uniform Magnetic Field
   - 9.5 Hall Effect

10. **Introduction to Quantum Physics (Ref. Chpt. 40, 42)**
    - 10.1 Blackbody Radiation and Planck's Hypothesis
    - 10.2 The Photoelectric Effect
    - 10.3 Atomic Spectra of Gases
    - 10.4 Early Models of the Atom and Bohr's Model of the Hydrogen Atom

11. **Nuclear Structure (Ref. Chpt. 44 and 45)**
    - 11.1 Properties of Nuclei and Binding Energy
    - 11.2 Radioactivity
    - 11.3 Radioactivity and Decay Processes
    - 11.4 Nuclear Physics: Fission
    - 11.5 Nuclear Physics: Reactors

Nuclear Physics: Fusion