CAMOSUN COLLEGE	**School of Arts & Science** **PHYSICS DEPARTMENT** **PHYS 101 001** **Introduction to Physics** **Spring 2016**

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:	11:30 am – 12:30 pm MTWThF		
(c)	Location:	F318/322 or F346C		
(d)	Phone:	250 370 4435	Alternative Phone:	
(e)	Email:	nelson@camosun.bc.ca		
(f)	Website:	D2L: online.camosun.ca		

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. Demonstrate skill in the use of S.I. base and derived units.
2. Draw graphs (by hand), determine slopes of linear graphs, linearize non-linear data, and write an equation to represent a linear graph.
3. Solve technical problems involving one-dimensional kinematics for a single particle with constant acceleration.
4. Solve technical problems involving the dynamics of a single particle in one dimension using Newton's Laws of Motion.
5. Perform vector analysis using scaled diagrams with applications to displacement and force.
6. Define the terms work, kinetic energy, gravitational potential energy and power.
7. Solve technical problems using the work-kinetic energy theorem and conservation of mechanical energy.
8. Solve technical problems involving simple DC electric circuits, Ohm's Law, and electric power.
9. Define and describe the following properties of waves: period, frequency, wave speed and amplitude.
10. Define the properties of light, including the electromagnetic spectrum.
11. State and apply the Law of Reflection and the Law of Refraction.
12. Assemble simple experimental apparatus using written instructions.
13. Observe, record, organize and display experimental data in tables, graphs or charts.
14. Analyze linear graphs (determine area, slope, intercept, etc.).
15. Interpret experimental results in the context of the experimental objectives.

3. Required Materials

(a) PHYS 101 Textbook (adapted from) "Physics Principles and Problems", Zitzewitz et al, McGraw-Hill Glencoe, 2009
(b) PHYS 101 Lab Manual
(c) Scientific Calculator / Drawing Instruments (ruler, protractor, etc.)
(d) Graph Paper (must be 10 mm x 10 mm)

4. Course Content and Schedule

LEC MWF 8:30 am – 9:20 am F316
LEC TTh 10:30 am – 11:20 am F306

LAB TTh 8:30 am – 10:20 am F316

5. Basis of Student Assessment (Weighting)

(a)	Final Exam	50%
(b)	Midterm Exams (best 2 out of 3)	30%
(c)	Weekly Quizzes (10)	5%
(d)	Weekly Homework	5%
(e)	Laboratory Workbook	10%
		100%

PHYSICS DEPARTMENT POLICIES REGARDING TESTING:

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

PHYSICS DEPARTMENT POLICIES REGARDING LABS:

- Students must obtain an overall grade of 60% or higher in the laboratory component of the course order to obtain credit for the course.
- 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.
- 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 may apply for lab exemption.

7. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

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.

8. 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 the College web site in the Policy Section.

OUTLINE:

1. **Measurement (Chapter 1)**
   - 1.1. Système international d'unités, SI (International System of Units) (Ch 1.1)
     - 1.1.1. Base Units
     - 1.1.2. Prefixes
     - 1.1.3. Derived Units
   - 1.2. Dimensional Analysis for unit conversion (Ch 1.1)
   - 1.3. Significant Figures (Ch 1.1)
   - 1.4. Precision and accuracy (Ch 1.2)
   - *1.5. Scientific Notation (additional material)*

2. **Graphical Analysis (Chapter 1)**
   - 2.1. Constructing graphs of linear data
     - 2.1.1. Plotting data (Ch 1.3)
     - 2.1.2. Best-fit line (Ch 1.3)
   - 2.2. Analyzing linear graphs (Ch 1.3)
     - 2.2.1. Determination of slope and intercept (Ch 1.3)
     - 2.2.2. The linear equation (Ch 1.3)
   - 2.3. Analyzing non-linear graphs
     - 2.3.1. Recognition of power graphs
     - *2.3.2. Changing variables to produce linear graphs (laboratory)*
     - *2.3.3. Writing equations for non-linear graphs (laboratory)*

3. **Kinematics in One Dimension (Chapter 2 and 3)**

3.1. Motion diagrams (Ch 2.1)
3.2. Position, distance, displacement (Ch 2.2)
3.3. Vector and scalar quantities (Ch 2.2)
3.4. Graphs of kinematic quantities
    3.4.1. Position versus time (Ch 2.3)
    3.4.2. Displacement versus time (Ch 2.4)
3.5. Speed and velocity (Ch 2.4)
3.6. Accelerated Motion
    3.6.1. Definition of acceleration (Ch 3.1)
    3.6.2. Graphs of velocity versus time (Ch 3.2)
    3.6.3. Kinematic equations of motion with constant acceleration (Ch 3.2)
    3.6.4. Acceleration due to Earth's gravity (Ch 3.3)
    3.6.5. Vertical motion near the Earth (Ch 3.3)

4. **Dynamics in One Dimension (Chapter 4)**
4.1. Force and accelerated motion (Ch 4.1)
4.2. Newton's first law of motion (Ch 4.1)
    4.2.1. Concept of inertia (Ch 4.1)
4.3. Newton's second law of motion (Ch 4.1)
    4.3.1. Applications of Newton's second law of motion (Ch 4.2)
4.4. Newton's third law of motion (Ch 4.3)
    4.4.1. Interaction forces (Ch 4.3)
    4.4.2. Ropes and strings (Ch 4.3)
    4.4.3. Normal forces (Ch 4.3)

5. Vectors in Two Dimensions (Chapter 5)
5.1. Scaled diagrams for displacements and forces (Ch 5.1)
5.2. Vector components in scaled diagrams (Ch 5.1)

6. Work, Energy and Power (Chapter 10 and Chapter 11)
6.1. Work done by a force (Ch 10.1)
6.2. Definition of mechanical power (Ch 10.1)
6.3. Types of mechanical energy (Ch 11.1)
    6.3.1. Kinetic energy (Ch 11.1)
    6.3.2. Gravitational potential energy (Ch 11.1)
    6.3.3. Elastic potential energy (Ch 11.1)
6.4. Work-Energy theorem (Ch 11.2)
6.5. Conservation of mechanical energy (Ch 11.2)

7. Waves (Chapter 14)
7.1. Types of mechanical waves
    7.1.1. Periodic Motion (Ch 14.1)
    7.1.2. Transverse waves (Ch 14.2)
    7.1.3. Longitudinal waves (Ch 14.2)
7.2. Properties of mechanical waves
    7.2.1. Amplitude (Ch 14.2)
    7.2.2. Wave speed (Ch 14.2)
    7.2.3. Wavelength (Ch 14.2)
    7.2.4. Frequency (Ch 14.2)
    7.2.5. Period (Ch 14.2)
    7.2.6. Wave Superposition (Ch 14.3) (Laboratory)

8. Light (Chapter 16, 17 and 18)
8.1. Properties and characteristics (Ch 16.1)
    8.1.1. Ray model (Ch 16.1)
    8.1.2. Luminous sources and illumination (Ch 16.1)

8.1.3. Opaque, transparent, and translucent materials (Ch 16.1)
8.2. Speed of light (Ch 16.1)
8.3. Wave model of light and the electromagnetic spectrum (Ch 16.2)
8.4. Law of Reflection (Ch 17.1)
8.4.1. Specular and diffuse reflection (Ch 17.1)
8.4.2. Images in plane mirrors (Ch 17.1)
8.4.3. Ray trace diagrams for plane mirrors (Ch 17.1)
8.5. Law of Refraction (Ch 18.1)
8.5.1. Snell's Law (Ch 18.1)
8.5.2. Total internal reflection (Ch 18.1)
8.5.3. Dispersion (Ch 18.1)
8.5.4. Ray trace diagrams for converging lens (Ch 18.2)

9. <u>Direct Current Circuits (Chapter 20 and Chapter 22)</u>
9.1. Definitions (Ch 20.1)
9.1.1. Properties of charge (Ch 20.1)
9.1.2. Electric current (Ch 22.1)
9.1.3. Voltage (Ch 22.1)
9.1.4. Resistance (Ch 22.1)
9.2. Ohm's Law (Ch 22.1)
9.3. Circuit Diagrams (Ch 22.1)
9.4. Electrical energy and power (Ch 22.2)
9.5. Resistors in Series (laboratory) (Ch 23.1)
9.6. Resistors in Parallel (laboratory) (Ch 23.1)