CAMOSUN COLLEGE	***School of Arts & Science*** ***PHYSICS DEPARTMENT*** **PHYS 191-X04** **Physics 1 Civil/Mechanical** **Q1 2015 X04**

COURSE OUTLINE

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

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

Instructor:	Stephanie LaForest
Office Hours:	TBA
Location:	TECH 222
Phone:	250-370-4470
Email:	laforests@camosun.bc.ca
Website Info:	D2L (online.camosun.ca)

2. Intended Learning Outcomes

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

1. Define the scientific method and give examples of its application.
2. Perform unit conversions using SI, Imperial and U.S. Customary units. Round measurements to the correct number of significant figures. Calculate uncertainties.
3. Add and subtract vectors using scale diagrams, the component method, and the laws of sines and cosines. Solve problems of concurrent forces in equilibrium.
4. Define the following kinematic vector quantities: displacement, velocity and acceleration, distance and speed. Use the kinematic equations to solve one- and two-dimensional problems involving uniformly accelerated motion. One-dimensional problems will consist of freefall and two-body problems, while two-dimensional problems will feature projectiles and trajectories.
5. Using Newton's Laws, answer conceptual problems with free-body diagrams. Solve two-dimensional dynamics problems involving normal forces, static and kinetic friction, tension forces, inclined planes, and connected objects. Calculate forces for objects in equilibrium.
6. Construct free-body diagrams for objects undergoing uniform circular motion, and calculate centripetal forces and accelerations. Answer conceptual problems for systems undergoing circular motion.
7. Define the terms work, energy, and power. Use the work-energy theorem or the law of conservation of energy to solve problems with and without dissipative forces. Calculate the power and efficiency of mechanical processes.
8. Calculate the centre-of-mass and moment-of-inertia for uniform objects. Use the parallel-axis theorem for moment-of-inertia calculations. Perform calculations and answer conceptual questions using torques. Solve equilibrium problems for non-concurrent forces.
9. Define the rotational kinematic quantities angular velocity and angular acceleration. Transform between linear and rotational quantities. Use the

rotational form of Newton's 2nd Law to solve dynamics problems. Calculate work, energy, and power for rotational systems.
10. Calculate the mechanical advantage and efficiency of simple machines.
11. Assemble simple experimental apparatus using written instructions.
12. Observe, record, organize and display data in tables, graphs or charts.
13. Analyze linear graphs (determine area, slope, intercept, etc.).
14. Interpret meaning of experimental results in the context of the experimental objectives.

3. Required Materials

(a) Texts "College Physics", 3rd edition, Knight, Jones & Field

(b) Other Physics for Technology 154/191/192 Laboratory Manual
Graph paper (must be either 10 lines/inch or millimeter graph paper)
Scientific Calculator

4. Course Content and Schedule

Lecture: Monday 2:30-3:20 pm CBA 385, Tuesday 2:30-3:20pm Tech 222, Wednesday 2:30-3:20pm Tech 181, Thursday 1:30-2:20pm Tech 222, Friday 2:30- 3:20pm Tech 173

Laboratory: Thursday 8:30 – 10:20 am TECH 222

5. Basis of Student Assessment (Weighting)

The student must be successful (≥ 60%) in both the laboratory assignments to pass the course. The percentages used for the final grading are:

a) Weekly Homework	5%
b) Weekly Quizzes	5%
c) Midterms	30% (Highest 3 out of 4)
d) Labs (MANDATORY)	10%
e) Final Exam (3 hours)	50%

Quizzes will be held during the last 15 minutes of Friday's class every week. Midterms are scheduled on the following dates: Oct. 16th, Nov. 3rd, Nov. 18th, Dec. 7th.

Only scientific calculators will be allowed during quizzes, midterms and the final exam. No calculator with graphing capabilities or other electronic devices will be allowed.

Labs are due in by the end of the lecture **one week after the lab period**. Homework assignments are due in at the end of the lecture **one week after homework is assigned**.

Late mark penalties are outlined in the Physics department policies below.

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 (p. 39) "students are expected to write tests and final exams at the scheduled time and place." Exceptions will only be considered for emergency circumstances as outlined in the calendar. Excursions, holidays or scheduled travel flights are not accepted.

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 AND HOMEWORK:

1. All assigned laboratory exercises and reports must be satisfactorily completed in order to obtain credit for this 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.

2. Lab exercises will be done on a bi-weekly basis during the scheduled lab period. Attendance is mandatory and you will be required to "sign in" at the beginning of each one. If, at the end of the lab period, it becomes necessary to complete your report at home, your data must be reviewed and signed (initialed) by the instructor before leaving the lab.

3. Unless otherwise stated by your instructor late penalties are as follows: For overdue labs (or assignments), a late penalty of 1 mark (10%) per day 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. **Measurement**
   - 1.1 Concept and process
   - 1.2 Significant figures
   - 1.3 Systeme Internationale (SI)
   - 1.4 British and practical units
   - 1.5 Unit conversions - review
   - 1.6 Error analysis
2. **Vectors**
   - 2.1 Representation of vectors and specification of directions
   - 2.2 Addition and subtraction of vectors
   - 2.3 Scalar and vector multiplication
   - 2.4 Component method
   - 2.5 Application of sine and cosine laws to vector problems
   - 2.6 Concurrent forces in equilibrium
3. **Kinematics**
   - 3.1 Kinematic quantities
     - 3.1.1 Position, distance and displacement
     - 3.1.2 Speed and velocity
     - 3.1.3 Acceleration
   - 3.2 Uniformly accelerated motion
   - 3.3 One-dimensional kinematic problems
     - 3.3.1 Free-fall
     - 3.3.2 Two-body problems

- 3.4 Two-dimensional kinematic problems
  - 3.4.1 Projectiles and trajectories

4. **Dynamics**
   - 4.1 Newton's laws of motion and conceptual problems
   - 4.2 Concept of force
     - 4.2.1 Normal forces
     - 4.2.2 Static and kinetic friction
     - 4.2.3 Tension forces
   - 4.3 Newton's second law of motion
     - 4.3.1 Free-body diagrams
     - 4.3.2 Problem-solving techniques
     - 4.3.3 Inclined planes
     - 4.3.4 Connected systems
     - 4.3.5 Two-dimensional problems
   - 4.4 Equilibrium
5. **Uniform Circular Motion**
   - 5.1 Centripetal acceleration
   - 5.2 Centripetal force
6. **Work, Energy and Power**
   - 6.1 Definition and concept
   - 6.2 Types of mechanical energy
     - 6.2.1 Kinetic energy
     - 6.2.2 Potential energy
   - 6.3 Work-energy theorem – conservation of energy
   - 6.4 Problems involving work and energy
     - 6.4.1 Without dissipative forces
     - 6.4.2 With dissipative forces
   - 6.5 Power as rate of doing work and change of energy
7. **Physics of a Rigid Body**
   - 7.1 Center of mass and center of gravity – calculations
   - 7.2 Torque
   - 7.3 Equilibrium of a rigid body
   - 7.4 Rotational inertia
     - 7.4.1 Parallel axis theorem
     - 7.4.2 Perpendicular axis theorem
     - 7.4.3 Methods of symmetry
   - 7.5 Rotational kinematics
     - 7.5.1 Definition of rotational kinematic quantities and units
     - 7.5.2 Formulas for uniformly accelerated rotation
     - 7.5.3 Relation between linear and angular quantities
   - 7.6 Rotational dynamics
     - 7.6.1 Dynamic equation
     - 7.6.2 Work, rotational kinetic energy, power
8. **Simple Machines**
   - 8.1 General theory
     - 8.1.1 Mechanical advantage
     - 8.1.2 Efficiency
   - 8.2 Application: Different types of machines