CAMOSUN COLLEGE	***School of Arts & Science*** ***PHYSICS DEPARTMENT*** **PHYS 115-001** **Fundamentals of Physics 2** **Spring 2009 (2009P)**

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:	Bob Sedlock		
(b)	Office Hours:			
(c)	Location:			
(d)	Phone:		Alternative Phone:	
(e)	Email:			
(f)	Website:			

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. Solve technical problems for objects undergoing uniform and non-uniform circular motion, and calculate centripetal forces and acceleration.
2. Solve technical problems using calculus involving work by constant and non-constant forces, the work-energy theorem, gravitational and elastic potential energy, in two and three dimensions.
3. Solve technical problems utilizing the concept of conservation of momentum of isolated systems, including elastic and inelastic collisions, the coefficient of restitution, and momentum conservation of systems of particles involving mass changes.
4. 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.
5. 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.
6. Solve technical problems involving the translational and rotational conditions of mechanical equilibrium of rigid systems.
7. Solve technical problems involving the electrostatic force, the electric field, and the electric potential of point charges.

8. Solve technical problems involving magnetic forces on moving charges, current-carrying wires, and practical applications of magnetism in science and technology.

3. Required Materials

(a) Texts — Physics for Scientists & Engineers with Modern Physics, *6th 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

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

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

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

Quizzes	35%
Lab Work	15%
Final Exam (3 hours)	50%

Midterm tests may be discounted from the grading distribution (see above) if all term work, including term tests, labs, and assignments, has been completed and is 60% or higher. In this case, the final grade for the course may be based on a combination of the final exam (90%) and the lab mark (10%).

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. 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.

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

6. Grading System

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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 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.

OUTLINE:

1. **Circular Motion (Sections 4.4, 4.5 and Sections 6.1, 6.2)**

   1.1 Uniform circular motion
   1.2 Tangential and radial acceleration
   1.3 Newton's second law and uniform circular motion
   1.4 Non-uniform circular motion

2. **Energy and Energy Transfer (Chapter 7.1 – 7.8)**

   2.1 Work done by a constant force
   2.2 Scalar product (review from P114)
   2.3 Work done by a varying force
   2.4 Kinetic energy and the work-energy theorem
   2.5 The non-isolated system – Conservation of energy
   2.6 Situations involving kinetic friction
   2.7 Power

3. **Potential Energy (Chapter 8.1 – 8.5)**

   3.1 Potential energy of a system
   3.2 The isolated system – Conservation of mechanical energy
   3.3 Conservative and non-conservative forces
   3.4 Changes in mechanical energy for non-conservative forces
   3.5 Relationship between conservative forces and potential energy

4. **Linear momentum and Collisions (Chapter 9.1 – 9.5)**

   4.1 Linear momentum and its conservation
   4.2 Momentum and impulse
   4.3 Collisions in one-dimension and two-dimensions
   4.4 The center of mass

5. **Rotational Kinematics and Dynamics (Chapter 10)**

   5.1 Angular position, velocity and acceleration
   5.2 Rotational kinematics
   5.3 Angular and linear quantities
   5.4 Rotational kinetic energy

5.5 Moments of Inertia of homogeneous rigid objects
5.6 Torque and angular acceleration
5.7 Work, power and energy in rotational motion
5.8 Rolling motion of a rigid object

6. **Torque and Equilibrium (Chapter 11.2 and Chapter 12.1 – 12.3)**

6.1 Vector product (review from P114) and torque – Section 11.1
6.2 Conditions for equilibrium
6.3 Center of gravity
6.4 Examples of objects in static equilibrium

7. **Electric Fields and Electric Potential (Chapter 23 and Sections 25.1 - 25.3)**

7.1 Properties of electric charges
7.2 Charging objects by induction
7.3 Coulomb's law
7.4 The electric field
7.5 Electric field lines
7.6 Motion of charged particles in a uniform E-field
7.7 Potential difference and electric potential – Section 25.1
7.8 Potential differences in a uniform E-field – Section 25.2
7.9 Electric Potential energy – Section 25.3

8. **Magnetic Fields (Chapter 29.1 – 29.5)**

8.1 Magnetic fields and forces
8.2 Magnetic force on a current-carrying conductor
8.3 Torque on a current loop in a uniform B-field
8.4 Motion of a charged particle in a uniform B-field
8.5 Applications involving charged particles moving in a B-field

9. **Oscillatory Motion (Chapter 15)**

9.1 Simple harmonic motion
9.2 Energy of the simple harmonic oscillator
9.3 SHM and circular motion
9.4 The pendulum
9.5 Damped and forced oscillations
9.5 Reflection and Transmission