CAMOSUN COLLEGE	***School of Arts & Science*** ***PHYSICS DEPARTMENT*** **PHYS 150-01** **Technical Physics 1** **2006Q1**

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:			
(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. Define the scientific method and give examples of its application. Define and give examples of precision and accuracy.
2. Round measurements to the correct number of significant figures. Express numbers using scientific notation.
3. Use the SI system of units to express measurements. Identify and use SI base units, prefixes, and derived units. Perform unit conversions within the SI system. Use the Imperial and U.S. Customary system of units and perform conversions to and from the S.I. system.
4. Construct graphs using a Cartesian coordinate system. Plot data and label the graph correctly, including a title and axes labels. Analyze linear graphs, including drawing a best-fit line, calculating the slope and y-intercept, and writing the equation of the graph. Analyze non-linear graphs, change variables to produce a linear graph, and write the equation of that graph.
5. Define the following kinematic quantities: displacement, velocity and acceleration, distance and speed. Identify vector and scalar quantities. Define and calculate average and instantaneous velocities and speeds. Plot and read kinematic graphs. Use the kinematic equations to solve one-dimensional problems involving uniformly accelerated motion, including freefall.
6. State Newton's Laws and answer related conceptual problems. Construct free-body diagrams. Describe the concepts of net force, mass and weight. Solve one-dimensional dynamics problems involving normal forces, friction, tension, and applied forces. Calculate forces for objects in equilibrium.

7. Define the terms work, kinetic energy, potential energy and power. Use the work-energy theorem or the law of conservation of energy to solve problems. Calculate the power and efficiency of mechanical processes.

3. Required Materials

(a)	Texts	Physics 150 Course Material (Camosun College Physics Department, 2004) Physics 150 Lab Manual
(b)	Other	Scientific calculator (any calculator, with the exception of personal computers, is acceptable) 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:	3
IN-CLASS WORKLOAD:	4 lecture, 2 lab (alt.weeks), 1 seminar
PRE-/CO-REQUISITES:	Math 172 or Math11 or Math 073 or assessment

OUTLINE:

1. **Measurement & Units**

- 1.1 Concepts of physics
- 1.2 Significant figures
- 1.3 Accuracy and precision – Calculations with significant figures
- 1.4 Scientific notation
- 1.5 Systeme Internationale (SI)
  - 1.5.1 Base units
  - 1.5.2 Prefixes
  - 1.5.3 Derived units
- 1.6 British Engineering and US Customary units - Conversion of units

2. **Graphical Analysis**

- 2.1 Graph construction
  - 2.1.1 Plotting data
  - 2.1.2 Fitting curves to data
- 2.2 Analyzing linear graphs
  - 2.2.1 Determination of slope and intercept
  - 2.2.2 The linear equation
  - 2.2.3 Proportionality and variation
- 2.3 Analyzing non-linear graphs
  - 2.3.1 Recognition of power graphs
  - 2.3.2 Types of variations
  - 2.3.3 Changing variables to produce linear graphs
  - 2.3.4 Writing equations for non-linear graphs

3. **Kinematics in One Dimension**

- 3.1 Kinematic quantities
  - 3.1.1 Vector and scalar quantities
  - 3.1.2 Position, distance and displacement
  - 3.1.3 Average speed and velocity
  - 3.1.4 Definition of instantaneous values
  - 3.1.5 Acceleration
- 3.2 Kinematic graphs
  - 3.2.1 Position versus time
  - 3.2.2 Displacement versus time
  - 3.2.3 Velocity versus time
- 3.3 Uniformly accelerated motion
  - 3.3.1 Equations
  - 3.3.2 Solving kinematic problems
  - 3.3.3 Acceleration due to gravity
  - 3.3.4 Vertical motion near the Earth

4. **Dynamics in One Dimension**

- 4.1 Concept of force
- 4.2 Newton's first law of motion
  - 4.2.1 Concept of inertia
- 4.3 Newton's second law of motion
  - 4.3.1 Dependence of acceleration on net force
  - 4.3.2 Dependence of acceleration on mass
  - 4.3.3 Dependence of net force on mass
  - 4.3.4 Dynamics examples – One body problems
- 4.4 Newton's third law of motion
  - 4.4.1 Interpretation of examples of the law

5. **Work, Energy and Power**

- 5.1 Work
  - 5.1.1 Definition
  - 5.1.2 Calculating work done by a force
  - 5.1.3 Positive and negative work
- 5.2 Types of Mechanical Energy
  - 5.2.1 Kinetic energy
  - 5.2.2 Gravitational potential energy
  - 5.2.3 Elastic potential energy
- 5.3 Work-Energy Theorem
- 5.4 Conservation of Mechanical Energy
- 5.5 Power and Efficiency

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

Final Exam	50%
Midterms and other work	50%

Lab Reports	(completion required)	100%

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	*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 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	*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.

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.

DEPARTMENT POLICIES REGARDING TESTING:

1. **Students must write quizzes, tests, midterm tests, etc., on the date and time assigned by the instructor. Missed exams normally receive a zero grade. In exceptional circumstances such as medical issues or a documented illness, a make-up exam may be given or the test may be waived at the discretion of the instructor. The instructor should be notified prior to the exam.**

2. **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. Holidays or scheduled travel flights are not accepted.**

DEPARTMENT POLICIES REGARDING LABS:

1. **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. As you complete the exercise your instructor will discuss your results with you and mark your work.**

2. **All assigned laboratory exercises and reports must be completed with an overall grade of 60% in order to obtain credit for this course. Attendance is required for all lab exercises at the scheduled times. A lab may be made up at a later time only in the case of documented illness or other extenuating circumstances.**

3. **At the discretion of the instructor, a student who is repeating this Physics course may not be required to complete the laboratory exercises a second time if an average lab grade of 70% or better was obtained.**

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.