CAMOSUN COLLEGE	***School of Arts & Science*** ***PHYSICS DEPARTMENT*** **PHYS 150 – X01** **Technical Physics 1** **Quarter 1, 2009**

COURSE OUTLINE

The Approved Course Description is available on the web @ http://intranet/ed_prov/CentralizedCurriculum.php

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. Course Instructor Information

Instructor: Nancy Luick
Office Hours: Mon.- Fri. 12:20 – 1:20 pm (Or by appointment)
Location: Tech 219
Phone: 250-370-4471
Email: luick@camosun.bc.ca
Website: luick.disted.camosun.bc.ca

Lab Instructor Information

Instructor: Wilf Nienaber
Location: Tech221
Phone: 250-370-4435
Email: Nienaber@camosun.bc.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. 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.

8. Assemble simple experimental apparatus using written instructions.
9. Observe, record, organize and display data in tables, graphs or charts.
10. Analyze linear graphs (determine area, slope, intercept, etc.).
11. Interpret meaning of experimental results in the context of the experimental objectives.

3. Required Materials

Textbook: Physics 150 Course Materials book

Other: Physics 150 Laboratory Manual
Graph paper (must be either 10 lines/inch or millimeter graph paper)

4. Course Content and Schedule

Class Times:	Mon., Wed.	9:30 – 10:20 am	Tech174
	Tuesday	9:30 – 10:20 am	Tech181
	Thursday	10:30 – 11:20 am	Tech181
Seminars:	Group A: Wednesday	10:30 – 11:20 am	Tech175
(Mandatory)	Group B: Thursday	9:30 – 10:20 am	Tech175
Lab Time:	Friday	9:30 – 11:20 am	Tech 222
(Mandatory, Alternate weeks)			

5. Basis of Student Assessment (Weighting)

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

Tests and homework	50%
Lab Reports	Completion Required
Final Exam (3 hours)	50%

PHYSICS 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. 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.

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. Excursions, holidays or scheduled travel flights are not accepted.

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 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.

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. Late Penalties: For any assigned work, a late penalty of one mark per day (10%) will be assessed for the first five days following the due date. After this date the completed work earns a maximum mark of 5/10.

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

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
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. **Measurement & Units**

    1.1 Concepts of physics
    1.2 Accuracy and precision
    1.3 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 Conversion of units – Metric and British units
    1.7 Problem solving

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
    2.3 Analyzing non-linear graphs
        2.3.1 Recognition of power graphs
        2.3.2 Changing variables to produce linear graphs
        2.3.3 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 Acceleration
- 3.1.5 Definition of instantaneous values

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 of uniform motion
- 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