**CAMOSUN COLLEGE**
***Arts and Science***
***Physics Department***

***PHYS 150 Physics 150 –Technical Physics 1***
***Quarter 1, 2006***

## COURSE OUTLINE (for Courses beginning Sept 2006)

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

Ω *Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records.*

## 1. Course Instructor Information

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|---|---|
| **Instructor** | Nancy Luick |
| **Office hours** | Mon., Wed., Thurs., Fri: 12:30 – 1:30 pm<br>Friday 9:30 – 10:30 am (Or by appointment) |
| **Location** | Tech 219 |
| **Phone** | 370-4471 |
| **E-mail** | luick@camosun.bc.ca |
| **Website** | luick.disted.camosun.bc.ca |

## 2. Intended Learning Outcomes

At the end of the 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

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

Note: The groups that must be formed for this class may not match exactly with your designated Group A and Group B assigned to you by the Mech. Dept

| | | | |
|---|---|---|---|
| **Class Times:** | Tues., Wed., Thurs., Fri. | 10:30 - 11:20 am | Tech 222 |
| **Seminars:** | Monday (Group B) | 9:30 - 10:20 pm | CC 104 |
| | Monday (Group A) | 10:30 - 11:20 pm | CC 123 |
| **Lab Time:** | Wednesday | 8:30 - 10:20 pm | Tech 222 |

## 5. Basis of Student Assessment (Weighting)

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:

| | |
|---|---|
| Best 3 out of 4 one-hour tests | 40% |
| Lab Work | 10% |
| 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%).

LATE POLICY: Late labs/assignments will be given a penalty of 25% per week.

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 five 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 this 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 to make arrangements to complete the lab prior to the end of classes for Q1.

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

## 6. Grading System

| | |
|---|---|
| X | Standard Grading System (GPA) |
| | Competency Based Grading System |

## 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, Student Services or the College web site at http://www.camosun.bc.ca

**STUDENT CONDUCT POLICY**

There is a Student Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.
http://www.camosun.bc.ca/policies/policies.html

## GRADING SYSTEMS *http://www.camosun.bc.ca/policies/policies.php*

**The following two grading systems are used at Camosun College:**

**1. 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 |

**2. Competency Based Grading System (Non GPA)**

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

| Grade | Description |
|---|---|
| COM | The student has met the goals, criteria, or competencies established for this course, practicum or field placement. |
| DST | The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement. |
| NC | The student has not met the goals, criteria or competencies established for this course, practicum or field placement. |

## B. 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 http://www.camosun.bc.ca/policies/E-1.5.pdf 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 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. |

## COURSE CONTENT:

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