PHYSICS DEPARTMENT
COURSE OUTLINE

PHYS 150 TECHNICAL PHYSICS 1

A first course to introduce students to the nature of physics with applications from technology. This is also recommended for students who took Physics 11 several years ago. Various topics including measurements & units, graphical analysis, 1-D kinematics, 1-D dynamics, work & energy are studied with the goal of introducing students to some concepts and the methodology of problem solving and data analysis.

OFFERED:	Q1, Q2
CREDIT:	3
IN-CLASS WORKLOAD:	4 lecture, 2 lab (alt.weeks), 1 seminar
PRE-/CO-REQUISITES:	Math 172 or Math11 or Math 063 or assessment

---

REQUIRED MATERIALS:

Physics 150 Course Material (Camosun College Physics Department, 2004)
Physics 150 Lab Manual
Scientific calculator (any calculator, with the exception of personal computers, is acceptable)
Graph paper (must be either 10 lines/inch or millimeter graph paper)

DEPARTMENT POLICIES REGARDING TESTING:

1. Students must write quizzes, tests, midterm tests, etc., on the date and time assigned by the instructor. 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.

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.

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

DEPARTMENT POLICIES REGARDING LABS:

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

2. 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.

GRADING

The standard mark distribution for this course is as follows:

Final Exam	50%
Midterms and other work	50%
Lab Reports	(completion required)
	100%

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