

# CAMOSUN COLLEGE

## PHYSICS DEPARTMENT

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### **PHYS 104 GENERAL COLLEGE PHYSICS 1**

This is the first part of a survey of physics primarily for students in life sciences and non-science programs. Students explore kinematics, dynamics, work, energy and power, thermal energy, nuclear energy and electricity. Students will also be introduced to some recent developments in physics and their effect on society.

OFFERED:	Fall, Winter
CREDIT:	4
IN CLASS WORKLOAD:	4 lecture, 2 lab
PREREQUISITES:	PHYS 060 or PHYS 150 or Physics 11 MATH 060 or MATH 11

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### **OUTLINE**

#### **1. Kinematics in one dimension**

- 1.1 Average and instantaneous velocity
- 1.2 Average and instantaneous acceleration.
- 1.3 Development of equations of uniformly-accelerated motion.
- 1.4 Application to motion of cart on level and inclined air-tracks.
- 1.5 Application to falling bodies.

#### **2. Dynamics 1**

- 1.1 Introduction to Newton's First, Second and Third Laws of Motion.
- 1.2 The vector nature of force.
- 1.3 Types of force (gravitational, contact, tension; relation to interatomic forces).
- 1.4 Free body diagrams. Concept of net force.
- 1.5 Principle of inertia. (Mach's principle; rotating pail experiment)

#### **3. Work, energy and power 1**

- 1.1 Definition. Work done by a force (positive and negative). Net work.
- 1.2 Kinetic energy. Effect of work done on a body.
- 1.3 Types of potential energy (gravitational, spring, chemical, nuclear). Effect of work done on a body.
- 1.4 Conservation of energy.

#### **4. Thermal energy**

- 1.1 Absolute temperature scale. Connection to molecular motion.
- 1.2 Heat as a form of energy; calorimetry.
- 1.3 Change of state and latent heat.
- 1.4 Heat transfer: radiation, conduction and convection. Applications.
- 1.5 Thermal expansion.

**5. Structure of matter**

- 1.1 Structure of the atom (composition of nucleus, relative sizes of nucleus and atom as a whole).
- 1.2 Isotopes, chemical elements and the periodic table.
- 1.3 Formation of atoms into molecules and crystals.
- 1.4 Chemical reactions and chemical potential energy.

**6. Nuclear energy**

- 1.1 Nuclear energy. Contrast with chemical energy.
- 1.2 The chain reaction. Applications (military, civil).
- 1.3 Nuclear waste; disposal and reprocessing.
- 1.4 Fusion energy; Applications (energy-production in stars, military, civil).

**7. Electricity**

- 1.1 Basic idea of electric charge and its relation to matter.
- 1.2 Law of electrostatic force.
- 1.3 Electric current. Brief outline of magnetic effects.
- 1.4 Electric fields and field line (qualitative).
- 1.5 Electric potential; the Volt. The electric battery.
- 1.6 Simple D.C. circuits and Ohm's Law.
- 1.7 Your electricity meter: the kWh.

In order to obtain a passing grade for this course, students must satisfactorily complete the lab component of the course.

Text and materials

Text: Similar to: Physics, Principles and Applications, Giancoli

Lab manual

Scientific calculator

Graph paper

*It is the policy of the physics department that instructors are not required to give make-up tests. At their discretion , instructors may give make-up tests in the case of documented excuses.*