

# CAMOSUN COLLEGE

## PHYSICS DEPARTMENT

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### **PHYS 105 GENERAL COLLEGE PHYSICS II**

Continuing from PHYS 104, topics include circular motion and gravitation, linear momentum in two dimensions, descriptive relativity, light, geometric optics, fluids, sound waves and interference, and basic magnetism. The relationship of physics to society and life-science is emphasized. PHYS 104 and PHYS 105 satisfy laboratory science requirements for students in non-science programs. (T)

OFFERED:	Fall, Winter
CREDIT:	4
IN CLASS WORKLOAD:	4 lecture, 2 lab
PREREQUISITES:	PHYS 104 or departmental assessment.

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### **OUTLINE**

#### **1. Kinematics in two dimensions: Circular motion, gravitation and projectiles**

- 1.1. Projectile Motion
- 1.2. Centripetal acceleration.
- 1.3. Development of  $v^2/r$  formula.
- 1.4. Newton's law of universal gravitation.
- 1.5. Application to circular planetary motion; Kepler's  $T^2 \propto r^3$  law.

#### **2. Momentum in two dimensions**

- 2.1. Law of conservation of linear momentum
- 2.2. Elastic and inelastic Collisions
- 2.3. The Impulse

#### **3. Descriptive Relativity**

- 3.1. Reference Frames
- 3.2. Postulates of the Special Theory of Relativity
- 3.3. Simultaneity
- 3.4. Time Dilation
- 3.5. Twin Paradox
- 3.6. Length Contraction
- 3.7. Relativistic Mass;  $E = mc^2$
- 3.8. Addition of Velocities (Galilean vs. Relativistic)

#### **4. Light and geometric optics**

- 4.1. Speed of light. Electromagnetic spectrum.

- 4.2. Reflection
  - 4.3. Image Formation in Mirrors
  - 4.4. Refraction. Snell's Law
  - 4.5. Total Internal Refraction
  - 4.6. Image Formation in Thin Lenses. Ray Tracing
  - 4.7. The Lens Equation. Lenses in Combination
  - 4.8. Lensmaker's Equation
  - 4.9. Telescope. Microscope. The Human Eye
- 5. Fluids**
- 5.1. Hydrostatic pressure. Density. Pascal's Principle.
  - 5.2. Buoyancy. Archimede's Principle.
  - 5.3. Equation of Continuity. Bernoulli's Equation.
  - 5.4. Bernoulli's Principle. Applications to human circulatory systems, air foils, sail boats
  - 5.5. Viscosity. Surface Tension.
- 6. Sound**
- 6.1. Properties of Sound (wavelength, frequency, speed)
  - 6.2. Standing Waves (air columns, strings)
  - 6.3. Interference of sound waves (beats)
  - 6.4. Doppler Effect
  - 6.5. Shock Waves
- 7. Magnetism**
- 7.1. Properties of permanent magnets. Terrestrial magnetism
  - 7.2. Magnetic fields from Electric circuits. Forces between wires.
  - 7.3. Magnetic forces on current carrying wires and moving charges
  - 7.4. Application topics: motors, galvanometers, Hall effect, mass spectrometer, speakers

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 (5<sup>th</sup> ed.) 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.*