

CAMOSUN COLLEGE

PHYSICS DEPARTMENT

PHYS 105 GENERAL COLLEGE PHYSICS 11

Continuing from PHYS 104, topics include circular motion, gravitation, light, geometric optics, dynamics, work, energy and power, linear momentum, fluids and descriptive relativity. 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)

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

OUTLINE

- 1. Circular motion and gravitation**
 - 1.1 Introduction to kinematics in two dimensions. Centripetal acceleration.
 - 1.2 Development of v^2/r formula.
 - 1.3 The law of universal gravitation.
 - 1.4 Application to circular planetary motion; Kepler's $T^2 \propto r^3$ law.
- 2. Light and geometric optics**
 - 2.1 Speed of light. Electromagnetic spectrum.
 - 2.2 Laws of reflection and refraction.
 - 2.3 Total internal reflection. Applications in medicine and fibre optics.
 - 2.4 Formation of images by mirrors.
 - 2.5 Formation of images by lenses.
 - 2.6 Optical instruments (microscopes, telescopes, the eye, conditions of the eye).
- 3. Dynamics II**
 - 3.1 Brief re-cap of Newton's laws of motion.
 - 3.2 Problems involving several simultaneous forces of different types.
- 4. Momentum**
 - 4.1 Law of conservation of linear momentum (one-dimensional).
 - 4.2 Collisions: elastic and inelastic.
 - 4.3 Impulse.

5. Descriptive Relativity

- 5.1 Principles of Special Relativity.
- 5.2 Space-time diagrams.
- 5.3 Relative speeds: law of velocity addition
- 5.4 Time dilation. Twin “paradox”.
- 5.5 Descriptive General Relativity and the principle of equivalence.
- 5.6 “Curved space” and black holes.

6. Fluids

- 6.1 Pressure. Fluid statics and density. The barometer.
- 6.2 Archimede’s Principle and buoyancy.
- 6.3 Pascal’s Principle and hydraulic lifts.
- 6.4 Bernoulli’s Principle. Applications to human circulatory systems, air foils, sail boats

7. Work, energy and power II

- 7.1 Problems involving work and kinetic energy.
- 7.2 Problems involving work and potential energy.
- 7.3 Problems involving work and both kinetic and potential energy.
- 7.4 Conservation of energy again; problems involving dissipative forces.

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 (5th 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 discretio , instructors may give make-up tests in the case of documented excuses.