

CAMOSUN COLLEGE

PHYSICS DEPARTMENT

PHYS 200 MECHANICS 2

A second-year, calculus-based course in classical mechanics and an introduction to special relativity. Topics covered: rotational motion, torque and angular momentum; oscillatory motion; mechanical waves; fluid mechanics; kinetic theory of gases; gravitation and planetary motion; introduction to the theory of special relativity.

OFFERED:	Fall
CREDIT:	4
IN-CLASS WORKLOAD:	4 lec, 2 lab
OUT-OF-CLASS WORKLOAD:	6
PREREQUISITES:	PHYS 115 or 120 and MATH 101
COREQUISITES:	Math 220

OUTLINE**1. Rotational Motion**

- 1.1 Rotational kinetic energy; moment of inertia (with extended mass distribution).
- 1.2 Torque; angular acceleration; angular momentum.
- 1.3 Problems involving rotational (fixed axis) dynamics of rigid bodies.

2. Oscillatory Motion

- 2.1 Simple harmonic motion; energy of SHM; damped SHM.
- 2.2 Simple pendulum; physical pendulum.
- 2.3 Forced oscillations.

3. Mechanical Waves

- 3.1 Types of waves; superposition and interference; wave velocity.
- 3.2 Transmission and reflection of waves; transmission of energy.
- 3.3 Velocity of sound waves; spherical and plane waves; Döppler effect.
- 3.4 Standing waves.

4. Fluid Mechanics

- 4.1 Fluid statics (pressure and density; Pascal's principle; Archimedes' principle).
- 4.2 Fluid dynamics (equation of continuity; Bernoulli's equation; applications).

5. Kinetic Theory of Gases

- 5.1 The ideal gas; a model.
- 5.2 Kinetic calculation of pressure; kinetic interpretation of temperature; internal energy of an ideal gas.
- * 5.3 Non-ideal gases.
- * 5.4 Transport phenomena.

6. Gravitation

- 6.1 Universal Law of Gravitation; gravitational PE; gravitational field.
- 6.2 Kepler's Laws of planetary motion.

7 Special Relativity

- 7.1 Introduction to Special Relativity (simultaneity; relativistic description of time; relativistic description of length; Lorentz transformations; relativistic momentum; relativistic energy).
- 7.2 Consequences of special relativity; space-time diagrams (will require material in addition to text - this will be provided to students).

* **If time allows**

TEXTS

"Physics for Scientists and Engineers (with Modern Physics)" by R.A. Serway