# Physics (PHYS) 200

## Introductory Physics I (Revision 7)

| | |
|---|---|
| **Status:** | Replaced with new revision, see the **course listing** for the current revision |
| **Delivery mode:** | **Individualized study online** with **eText**, and a **Home Lab**. PHYS 200 has a **lab exemption** This course is charged a **lab fee** |
| **Credits:** | 3 |
| **Area of study:** | Science |
| **Prerequisites:** | None |
| **Precluded:** | **PHYS 204**, PHYS 274 |
| **Challenge:** | PHYS 200 is not available for challenge. |
| **Faculty:** | **Faculty of Science and Technology** |
| **Notes:** | **Detailed Syllabus and Assessment** (PDF)<br><br>If you are interested in a university physics course at a more introductory level and with no lab requirement, you may want to consider **PHYS 210**. |

## Overview

PHYS 200 is the first course in algebra-based physics, which provides an introduction to classical mechanics and includes a hands-on laboratory component. In addition to the eTextbook, the course material includes a well-written *Study Guide* designed for independent learning. PHYS 200 combined with either PHYS 201 or PHYS 202 is the equivalent of one year of introductory physics.

## Outline

PHYS 200 comprises the following ten units.

- Unit 1: Introduction: The Nature of Science and Physics
- Unit 2: Kinematics
- Unit 3: Two-Dimensional Kinematics
- Unit 4: Dynamics: Force and Newton's Laws of Motion
- Unit 5: Further Applications of Newton's Laws: Friction, Drag, and Elasticity
- Unit 6: Uniform Circular Motion and Gravitation
- Unit 7: Work, Energy, and Energy Resources
- Unit 8: Linear Momentum and Collisions
- Unit 9: Statics and Torque
- Unit 10: Rotational Motion and Angular Momentum

### Lab Component

PHYS 200 includes a compulsory lab component, which comprises six hands-on experiments performed in a place of the student's choice. Procedures involves video capture and analysis of moving objects and requires some common household items, such as the video camera in a smartphone. Assessment is based on a written lab report. The PHYS 200 course material explains the following experiments.

- Experiment 1: Graphical Analysis
- Experiment 2: Kinematics in One Dimension
- Experiment 3: Projectile Motion
- Experiment 4: Hooke's Law

- Experiment 5: Collision in Two Dimensions
- Experiment 6: Rolling Motion

Students may qualify for partial or full **transfer of lab credit** obtained for equivalent lab work at another institution.

## Learning outcomes

Upon successful completion of this course, you should be able to

- convert between different units and express a physical quantity in scientific notation using the appropriate number of significant digits.
- explain the relationships between time, displacement, velocity and constant acceleration, and use algebra to solve kinematic problems in one or two dimensions.
- analyze and solve dynamic problems using vector addition, Newton's three laws of motion, and resistive forces.
- analyze and solve work-, energy- and power-related problems using appropriate formulas and the conservation of energy principle.
- outline the conservation of linear momentum principle and apply it to solve problems that involve one- and two-dimensional (elastic and inelastic) collisions.
- define the concepts of torque and centre of mass and solve problems that involve static equilibrium of extended bodies.
- analyze and solve problems that involve the kinematics and dynamics of rotational motion and the conservation of angular momentum principle.
- describe Hooke's law and the elastic properties of solids and apply formulas for calculating Young's modulus, shear modulus, and bulk modulus.
- recall Newton's law of universal gravitation and apply it to solve problems involving the force of gravity and satellite motion.
- demonstrate skills related to performing simple experiments in classical mechanics, including experimental setup, data acquisition, data analysis, and communication of scientific results.

## Evaluation

Final grade is based on marks achieved on two assignments, six lab reports, and two examinations. To receive credit, the student must achieve a minimum of 50 percent

on the final examination and on the lab component, and a course composite grade of at least “D” (50 percent). The following chart describes the credit weight associated with each course requirement.

| Activity | Weight |
|---|---|
| Assignments | 20% |
| Lab Reports | 20% |
| Midterm Online Exam | 20% |
| Final Online Exam | 40% |
| **Total** | **100%** |

The **midterm and final examinations** for this course must be requested in advance and written under the supervision of an AU-approved exam invigilator. Invigilators include either ProctorU or an approved in-person invigilation centre that can accommodate online exams. Students are responsible for payment of any invigilation fees. Information on exam request deadlines, invigilators, and other exam-related questions, can be found at the **Exams and grades** section of the Calendar.

To learn more about assignments and examinations, please refer to Athabasca University’s **online Calendar** .

## Materials

This course either does not have a course package or the textbooks are open-source material and available to students at no cost. This course has a **Course Administration and Technology Fee** , but students are not charged the Course Materials Fee.

OpenStax College, ***College Physics***. OpenStax College. 21 June 2012. (eText)

### eText

Registration in this course includes an electronic textbook. For more information on **electronic textbooks** , please refer to our **eText Initiative site** .

PHYS 200 is based on the OpenStax College Physics eTextbook, which is open source material licensed under the **Creative Commons Attribution 3.0 Unported** license.

### Other Resources

All other learning resources will be available online.

## Important links

- **Academic advising**
- **Program planning**
- **Request assistance**
- **Support services**

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

*Opened in Revision 7, April 12, 2017*

*Updated August 26, 2024*

View **previous revision**