General Physics I Lab (PHY250L)

Course Materials

- Custom Lab Kit from eScienceLabs.com (please use the "find my kit" button) which is $129.00; please enter this code [Kit2265] to ensure that you purchase the correct Lab.

Course Description

This lab-only course is designed as a standalone addition to StraighterLine's General Physics I course. Students will complete at-home laboratory experiments, track and record results, answer lab-based questions reflected in graded lab reports, and complete lab-based assessments to meet the lab requirement. The labs are provided by eScience Labs, a leading provider of at home lab kits and online lab instructional materials and resources.

Course Prerequisites

StraighterLine suggests, but does not require, that students complete an equivalent to General Calculus I (MAT250) prior to enrolling in this course. Concurrent enrollment in StraighterLine's General Physics I course (PHY250) is strongly encouraged.

Course Objectives

After completing this course, you will be able to:

- discuss uncertainty in measurement and significant digits
- solve problems involving linear, projectile, and circular motion
- explain Newton's laws and how they apply to free body diagrams
- discuss the difference between static and kinetic friction
- compare and contrast types of energy
- describe how momentum is conserved in elastic collisions
- apply Archimedes' by measuring buoyant force and displaced water weight
- differentiate between specific and latent heat
- distinguish between work done by systems and work done on systems

Important Terms

In this course, different terms are used to designate tasks:

- **Tutoring**: memberships include online tutoring for students to access with any content/subject related questions in the place of faculty. If your tutor is not able to answer your questions please contact a student advisor.
- **Lab Worksheets**: These are experiments that you will complete at home and be assessed on through online exercises.
- **Lab Exam**: A graded online test.

Important Note: All lab uploads must represent your own individual work. Even if you are working in a group with other students, each individual student must submit independent work. If you submit identical submissions or share submissions with another student, you will earn a zero for the assignment and will not earn credit for the course.

Course Evaluation Criteria

StraighterLine provides a percentage score and letter grade for each course. See Academic Questions section in FAQ for further details on percentage scores and grading scale. A passing percentage is **70%** or higher.

If you have chosen a Partner College to award credit for this course, your final grade will be based upon that college's grading scale. Only passing scores will be considered by Partner Colleges for an award of credit[1].

There are a total of 1000 points in the course[2]:

Topic	Assessment	Points
1	Measurements and Uncertainty Worksheet	83
	Lab Exam	42
2	Kinematics Worksheet	83
	Lab Exam	42

[1] Please note that all required materials (as reflected in lab instructions) must be completed to be eligible for a transcript. Required materials include lab exercises (Worksheets) and digital photographs of laboratory exercises. If these files are not submitted, StraighterLine will not be able to provide students a final grade.

[2] Note that the actual total reflected here is 1125. However, your lowest lab worksheet and lowest lab exam grade will be dropped for a final total of 1000 possible points.

3	Newton's Laws Worksheet	83
	Lab Exam	42
4	Friction Worksheet	83
	Lab Exam	42
5	Work and Conservation of Energy Worksheet	83
	Lab Exam	42
6	Conservation of Momentum Worksheet	83
	Lab Exam	42
7	Buoyant Force and Archimedes' Principle Worksheet	83
	Lab Exam	42
8	Latent Heat and Specific Heat Worksheet	83
	Lab Exam	42
9	Thermodynamics Worksheet	83
	Lab Exam	42
Total		1000

Course Topics and Objectives

Lab	Title	Objectives
1	Measurements and Uncertainty	• Demonstrate the use of a Vernier scale and explain different reasons for error when reading scales • Determine the uncertainty for a ruler, caliper, spring force scale, and stopwatch • Determine the density of the material of the mass set • Explain the reasons for error in calculations
2	Kinematics	• Distinguish between scalar and vector quantities • Apply kinematic equations to predict 1-D motion and projectile

		• Interpret 1-D motion graphs • Predict position, velocity, and acceleration vs. time graphs • Calculate average and instantaneous velocity or acceleration
3	Newton's Laws	• Formulate the law of inertia • Relate force and acceleration • Apply action and reaction pairs to forces • Draw and explain free body diagrams • Apply Newton's Second Law to the Atwood Machine • Relate velocity, radius, and time period to uniform circular motion
4	Friction	• Explore and explain the difference between static and kinetic friction • Determine the dependence of the force of friction on the normal force • Apply the force of friction to objects on an incline
5	Work and Conservation of Energy	• Relate energy to work • Calculate the amount of work done by a force • Compare and contrast types of energy • Apply the Law of Conservation of Energy to potential and kinetic energy
6	Conservation of Momentum	• Apply conservation of momentum to elastic collisions • Observe how the rate that momentum changes is related to force and time • Interpret graphs for elastic and inelastic collisions
7	Buoyant Force and Archimedes' Principle	• Predict the behavior of fluids as a result of properties including viscosity and density • Demonstrate why objects sink or float • Apply Archimedes' Principle by measuring buoyant force and weight of water displaced • Apply Archimedes' Principle to calculate the density of a material
8	Latent Heat and Specific Heat	• Observe how temperature changes during phase changes of water • Relate a change in temperature to the amount of heat lost by an object • Calculate specific heat for given materials
9	Thermodynamics	• Use the first law of thermodynamics to confirm the Law of Conservation of Energy

		• Distinguish between work done by systems and work done on systems • Identify the different processes of heat transfer including conduction, convection, and radiation