

PHY250L | General Physics I Lab

Course Text

Custom Lab Kit--Sold Separately

This course requires [lab kit LP-5366-PK-01](#) from Science Interactive for \$173 (plus shipping).

Course Description

This lab-only course is designed as a standalone addition to the 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 Science Interactive, a leading provider of at home lab kits and online lab instructional materials and resources.

Learning Outcomes

After completing this course, students will be able to:

1. Discuss uncertainty in measurement and significant digits
2. Solve problems involving linear, projectile, and circular motion
3. Explain Newton's laws and how they apply to free body diagrams
4. Discuss the difference between static and kinetic friction
5. Compare and contrast types of energy
6. Describe how momentum is conserved in elastic collisions
7. Apply Archimedes' by measuring buoyant force and displaced water weight
8. Differentiate between specific and latent heat

Course Prerequisites

It is suggested, but not required, that students complete an equivalent to General Calculus I (MAT250) prior to enrolling in this course. Concurrent enrollment in the General Physics I course (PHY250) is strongly encouraged.

Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Violations of academic integrity include, but are not limited to, plagiarism, cheating, fabrication and academic misconduct. Failure to comply with the Academic Integrity Policy can result in a failure and/or zero on the attempted assignment/examination, a removal from the course, disqualification to enroll in future courses, and/or revocation of an academic transcript.

Course Completion Policy

In order for a course to be considered complete, **all required coursework must be attempted, submitted, and graded.** Required coursework consists of graded assignments. Any Academic Integrity Policy violations may prevent a course from being considered complete.

Assessment Types

StraighterLine courses may include any combination of the assessment types described below. Review the descriptions to learn about each type, then review the Course Evaluation Criteria to understand how your learning will be measured in this course.

Benchmarks

Benchmarks test your mastery of course concepts. You have 3 attempts, and your highest score counts.

Note: Cumulative Benchmarks (final exams) only allow 1 attempt.

Capstones

Capstones are project-based assessments that help you apply concepts to real-world scenarios. You have 2 attempts, and your highest score counts.

Checkpoints

Checkpoints are quick knowledge checks on important course concepts. All are open-book, and most have 1-3 attempts.

AI Use-Case Policies

StraighterLine Capstone assessments operate under one of three AI Use-Case Policies. These designations are selected intentionally to support learners in developing digital literacy, ethical reasoning, and authentic communication skills. Each model requires students to engage meaningfully with the course outcomes while adhering to academic standards.

Independent Work Requirement: Capstones with this designation must be completed independently without using AI tools. The goal is for learners to showcase their own understanding and skills without AI assistance. Students are expected to generate and submit original work developed solely through their own reasoning and effort.

AI-Assisted Planning Option: Capstones with this designation may allow AI tools to support brainstorming and assessment planning. If allowed, students will be asked to document any AI assistance by noting how it informed their work. Documentation must be included within the assignment or in a designated reflection field. Examples include describing how an AI tool helped organize an outline, generate ideas, or surface sources for further exploration.

AI-Integration Requirement: Capstones with this designation require AI tools as part of the learning process. Students will be asked to reflect upon their AI interactions and AI contributions to the assessment. Reflections must include which tools were used, how they were used, and what insights students gained from the process. This promotes transparency, ethical use, and metacognitive skill-building.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is 70% or higher.

There are a total of 1000 points in the course:

Assessment	Points	Learning Outcomes
Checkpoint 1: Getting Started	3	N/a
Checkpoint 2: Lab Safety	3	N/a
Checkpoint 3: Lab Kit Inventory	4	N/a
Capstone 1: Kinematics	90	2
Capstone 2: Centripetal Acceleration	90	2
Capstone 3: Conservation of Momentum	90	5, 6
Capstone 4: Friction	90	4
Capstone 5: Measurement Techniques	90	1, 7
Capstone 6: Specific Heat of Solids	90	8
Capstone 7: Energy	90	5
Capstone 8: Projectile Motion	90	2
Capstone 9: Newton's Laws of Motion	90	3
Capstone 10: Introduction to Experimental Errors and Uncertainty	90	1
Capstone 11: Contact Forces	90	3, 4
Total	1000	

Course Roadmap

This roadmap provides an overview of the checkpoints and lessons covered in this course.

Checkpoint 1: Getting Started

- The Science Interactive Cloud
- Exploration, Experimentation, and Evaluation
- Science Interactive Resources

Checkpoint 2: Lab Safety

- Safety guidelines for using Science Interactive lab kits
- Terms associated with common laboratory safety equipment

Checkpoint 3: Lab Kit Inventory

- Kit contents list

- Reviewing your Science Interactive kit

Capstone 1: Kinematics

- Displacement, velocity, and acceleration
- Motion diagrams for different types of motion
- Displacement, velocity, and acceleration versus time graphs
- Free fall motion in one dimension

Capstone 2: Centripetal Acceleration

- Uniform circular motion, tangential velocity, angular displacement, centripetal acceleration, and centripetal force
- Force that causes the centripetal motion of a spinning object

Capstone 3: Conservation of Momentum

- Momentum and impulse
- Conservation and kinetic energy
- Law of Conservation of Momentum
- Elastic and inelastic collisions

Capstone 4: Friction

- Static and kinetic friction forces and coefficients
- Static and kinetic friction
- Microscopic causes and macroscopic consequences of friction
- How friction forces are represented in free-body-diagrams

Capstone 5: Measurement Techniques

- Basic and derived units of measurement commonly used in physics laboratories
- Vernier calipers are used for precision measurements
- How volume and density are calculated for solid cubes, spheres, and cylinders

Capstone 6: Specific Heat of Solids

- Heat, heat capacity, specific heat, thermal energy, and temperature
- Thermal energy transfer
- Calorimetry and calorimeters

Capstone 7: Energy

- Mechanical energy, kinetic energy, potential energy, and thermal energy
- Energy transfer and energy transformation
- Law of conservation of energy
- How energy bar charts are used to interpret energy transformation

Capstone 8: Projectile Motion

- Projectile motion, trajectory, and range
- Independence of horizontal and vertical motion

- How initial conditions affect trajectory

Capstone 9: Newton's Laws of Motion

- Inertia, velocity, and acceleration
- Newton's three laws of motion

Capstone 10: Introduction to Experimental Errors and Uncertainty

- Error, true value, and uncertainty
- How random and systematic errors affect experimental measurements
- Accuracy and precision

Capstone 11: Contact Forces

- Contact and non-contact forces
- Static and kinetic friction
- Hooke's law
- Normal force and tension
- How free-body diagrams are used to display forces

Related Courses

PHY250

General Physics I

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MAT250

General Calculus I

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BIO250

Microbiology

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