

## University of Houston-Downtown

**Course Prefix, Number, and Title:** PHYS 1307: General Physics I

**Credits/Lecture/Lab Hours:** 3/3/0

**Foundational Component Area:** Life and Physical Sciences

**Prerequisites:** Credit or enrollment in MATH 1302 or the equivalent and enrollment in PHYS 1107.

**Co-requisites:** None

**Course Description:** This is the first in a two-part survey of general physics for science majors focusing on elementary principles of mechanics, heat and wave motion using elementary trigonometry and algebra. Topics include kinematics, dynamics of particles and rigid bodies; conservation of mass, momentum and energy; simple harmonic motion and characteristics of waves, mechanical and thermal properties of solids and fluids; and thermal properties, kinetics and dynamics of ideal gases. Credit for both PHYS 1307 and PHYS 2401 may not be applied toward a degree.

**TCCNS Number:** PHYS 1301

**Demonstration of Core Objectives within the Course:**

Assigned Core Objective	Learning Outcome Students will be able to:	Instructional strategy or content used to achieve the outcome	Method by which students' mastery of this outcome will be evaluated
Critical Thinking  Empirical & Quantitative Reasoning	Utilize scientific processes to identify questions pertaining to natural phenomena.	The lecture presents theory from the perspective of the historical and mathematical development of Physics. The question "Why?" is prominent in lecture. The lab component is tied to the lecture material so that students can address the "Why?" in lab. Topics discussed include the Laws of Motion, Energy, Solids and Fluids, Thermal Physics, Vibrations and Waves.	Students' ability to understand phenomena is addressed through exams which are based on "word problems." These word problems are presented as real-world situations with information combining experimental observation and hypotheses. Students must understand the correct question and apply the correct mathematical tool to answer the question.  Students will have exams in which they have to solve numerous problems covering all material discussed during class. The exams will be graded for approach to solving the problem and scientific accuracy.

<p>Critical Thinking Empirical &amp; Quantitative Reasoning</p>	<p>Utilize scientific processes to develop hypotheses, collect and analyze data using quantitative and qualitative measures.</p>	<p>Students must perform experiments in lab, make observations, collect data, calculate results, and generate graphs in the co-requisite 1107 laboratory on topics of: linear, projectile, and circular motion, gravity, collisions, Newton’s laws of motion, friction, and waves: mechanical and acoustic.</p>	<p>Students are given lab practical exams where they must arrange equipment, perform experiments, collect data, and calculate results. These experiments involve some change from what the student has previously done so that the student must reason to a new approach and analysis to obtain the required results. Students will be assessed on their ability to recognize and correctly use the appropriate formula and draw correct conclusions.</p>
<p>Critical Thinking Empirical &amp; Quantitative Reasoning Communication</p>	<p>Utilize scientific processes to effectively communicate the analysis and results using written, oral and visual communication.</p>	<p>Students must record procedures, data, and observations in a bound notebook during lab. Then each student must perform the required analysis and generate multiple graphs to present the results in a convincing manner. All work must be documented in typed laboratory reports that are written according to publication standards. Once in semester each student will be required to give oral/visual presentation in the lab on topic covered. Presentations will be evaluated for quality of communication and scientific accuracy using a rubric.</p>	<p>Typed laboratory reports are collected on a weekly basis and graded for content, style, and correct analysis. Each student typically generates over 50 pages of typed text each semester. Students are often approached during lab and asked to make a defense of their procedures (whether right or wrong) and their calculations. Students are expected to understand the experiments and are given concepts and ideas to work with instead of written procedures and recipes. Written lab reports will be evaluated for both scientific accuracy and quality of written communication using a rubric. Oral presentations will also be evaluated for quality of communication and scientific accuracy using a rubric. Written lab reports will be evaluated for both scientific accuracy and quality of written communication using a rubric.</p>

<p>Teamwork</p>	<p>Collaborate in the evaluation of the quality of scientific evidence from multiple perspectives toward the goal of reaching a shared objective.</p>	<p>In each lab session student teams perform experiments together with one specified piece of equipment. Students will test equations by comparing observed and expected values.</p>	<p>All students are asked to submit a copy of their data before leaving the lab. If there is a problem with the data, students are asked to repeat the experiment or re-analyze their data. Successful completion of the experiment is part of the lab grade. A portion of the student's grade will be based on the group completion of data tables.</p>
-----------------	---	--	--

**Additional Course Outcomes:** N/A

**Course Outline:**

Lecture:

- Mechanics, Motion in One Dimension
- Vectors and two-Dimensional Motion,
- The Laws of Motion,
- Energy
- Momentum and Collisions
- Rotational Motion and the Law of Gravity
- Rotational Equilibrium and Rotational Dynamics.
- Solids and Fluids
- Thermal Physics
- Energy in Thermal Processes
- Vibrations and Waves, Sound

Lab:

- Gravitational Acceleration
- Projectile Motion
- Force Table
- Atwood's Machine
- Static and Kinetic Friction
- Conservation of Mechanical Energy
- One-Dimensional Collisions
- Centripetal Acceleration
- Torque and Moment of Inertia
- Buoyancy
- Spring and Pendulum
- Standing Waves

**Lecture: Grading/Course Content which Demonstrates Student Achievement of Core Objectives:**

**Course Grade            A: 90-100            B: 80-89            C: 70-79            D: 60-69            F: 0-59**

<b>Summary of Course Exams, Quizzes, Activities, and Final</b>	
Partial Exams (3)	60%
Final	40%

**Lab: Grading/Course Content which Demonstrates Student Achievement of Core Objectives:**

**Course Grade            A: 90-100            B: 80-89            C: 70-79            D: 60-69            F: 0-59**

<b>Summary of Course Exams, Quizzes, Activities, and Final</b>	
Lab and Related Report (7pts each/12 labs total) One lab report will be an oral presentation	84pts
Exams (14 pts each/2 exams total)	28 pts
Total	112 pts