

South Plains College
Common Course Syllabus: PHYS 1410
Revised 01/11/2023

Department: Science

Discipline: Physics

Course Number: PHYS 1410

Course Title: Elementary Physics

Available Formats: conventional

Campuses: Levelland

Instructor:

David Hobbs

Office: S67

Office Hours: TT 1:30 – 4:00 pm, F 8:30 – 11:30 am

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Course Description: Conceptual level survey of topics in physics intended for liberal arts and other non-science majors.

Prerequisite: There are no prerequisites for this course, however you will be expected both on the homework and in the exams to be able to perform simple mathematical calculations. Examples of the mathematical concepts we will use in this course are scientific notation, multiplying and dividing powers of 10, converting between different metric units, rearranging and solving simple equations. It will be assumed that you are familiar with high school algebra.

Credit: 4 **Lecture:** 3 **Lab:** 3

Textbook: *Conceptual Physics, 13th Edition* by Paul G. Hewitt (Pearson, 2021).

The textbook and Mastering Physics learning platform will be available through Blackboard.

This course partially satisfies a Core Curriculum Requirement:

Life and Physical Sciences Foundational Component Area (030)

Core Curriculum Objectives addressed:

- **Communications skills**—to include effective written, oral and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts resulting in informed conclusions
- **Teamwork**—to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Student Learning Outcomes:

Learning Outcomes - Upon successful completion of this course, students will:

1. Distinguish between displacement, velocity, and acceleration
2. Solve simple problems involving uniform motion, uniformly accelerated motion, or uniform circular motion
3. State Newton's Laws of Motion, explain the meaning of each, and identify applications of each
4. Apply Newton's laws of motion to relate forces to motion for simple physical cases
5. Define momentum and solve simple problems involving conservation of momentum
6. Identify types of energy in a system and solve simple problems involving conservation of energy
7. Describe the basic structure of an atom in terms of protons, neutrons, and electrons
8. Make simple calculations involving changes in temperature as well as phase changes when systems at different temperatures interact
9. Describe and calculate basic properties of waves such as frequency, wavelength, and amplitude
10. Discuss wave interference and the conditions for constructive and destructive interference
11. Describe standing waves and determine the frequencies of the harmonics
12. Discuss electric charge and the role it plays in atomic structure.
13. Calculate electrical forces using Coulomb's law.
14. Describe electric field and discuss electrical interactions in terms of electric field.
15. Discuss simple electrical circuits and make calculations using Ohm's law applied to series and parallel circuits.
16. Describe magnetic field and discuss interactions of magnetic fields with moving charges.
17. Discuss and apply Faraday's law of electromagnetic induction
18. Relate changing magnetic fields to induced electric fields.
19. Describe electromagnetic waves in terms of electric and magnetic fields and electromagnetic induction
20. Discuss the spectrum of electromagnetic waves from radio waves to x-rays.
21. Discuss diffraction and interference and how they arise based on superposition and Huygens' Principle.
22. Make simple calculations related to the photoelectric effect and the Bohr model of the hydrogen atom
23. State the Pauli Exclusion Principle and specify its implications for atomic structure
24. Discuss how quantum mechanics explains the structure of the periodic table
25. Describe the basic structure of a nucleus and explain the meaning of different isotopes
26. Recall the three basic types of radioactivity and describe some properties of each
27. Use radioactive half-life in simple calculations
28. Describe the basic principles of radioactive dating
29. Discuss the use of nuclear fission in electric power generation

Student Learning Outcomes Assessment: Selected questions on tests will assess how well students have met targeted student learning outcomes.

Course Evaluation: Student grades will be based on daily work, homework, and tests. Final grades will be assigned based on overall point total, using the point values shown below:

Task	Points
Daily Work	25
HW & Tests	75

The letter grades will be based on a fixed scale as follows:

A: 89.5 – 100 B: 79.5 – 89.5 C: 69.5 – 79.5 D: 59.5 – 69.5 F: below 59.5

Borderline cases (within 0.5 points of the break) will be decided based on class participation.

Attendance Policy: Attendance and effort are vital to success in this course. Class attendance keeps you well connected to the course and gives you opportunities to ask questions and clear up confusions. Therefore, students are expected to be in attendance for every class session. Students who stop attending class will *not* be administratively dropped. *You* must complete the appropriate drop procedure or you may end up receiving a failing grade in the course at the end of the semester.

Daily Work: Daily work consists of reading quizzes completed before class discussion of the chapter and in-class (lab) practice with feedback. These in-class activities are meant to be formative exercises and are graded primarily on participation. Their purpose is to help develop understanding of the concepts and principles and to prepare you for the tests.

Daily Work Grade Determination: Your daily work grade (up to a maximum of 25 points) will be determined as follows:

Reading Quizzes: 23 quizzes worth $\frac{1}{2}$ point each

In-class Practice: 20 sessions worth one point each

Homework: Do your homework! There is no substitute. Students who don't put in a good effort often struggle in the course. Homework will be assigned and graded online. Average of all chapter assignments will be used to determine the homework points (average homework percentage \times 25 points). A better homework grade will replace your lowest test score.

Tests: Three tests will be given during the semester as shown on the course calendar. Each test will be worth 25 points. There will be no make-up tests given, so a test missed counts as zero. However, your lowest test grade will be replaced automatically by a greater homework score at the end of the semester. Thus, in addition to demonstrating your grasp of the subject and helping you to prepare for tests, a good homework grade provides "insurance" against a low or missing test grade.

Plagiarism and Cheating: Students are expected to do their own work on all projects, quizzes, assignments, examinations, and papers. Failure to comply with this policy will result in an F (grade of zero) for the assignment and can result in an F for the course if circumstances warrant.

Plagiarism violations include, but are not limited to, the following:

1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:

1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's;
9. Taking pictures of a test, test answers, or someone else's paper.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning. Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

Diversity Statement: In this class, the teacher will establish and support an environment that values and nurtures individual and group difference and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Disability Statement: Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Lubbock Centers (located at the Lubbock Downtown Center) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

Nondiscrimination Policy: South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

Title IX Pregnancy Accommodations Statement: If you are pregnant, or have given birth within six months, under Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations, you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Health and Wellness Center. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Health and Wellness Center at 806-716-2529 or email dburleson@southplainscollege.edu for assistance.

Covid Statement:

If you are experiencing any of the following symptoms, please do not attend class and either seek medical attention or test for COVID-19.

- Cough, shortness of breath, difficulty breathing
- Fever or chills
- Muscles or body aches
- Vomiting or diarrhea
- New loss of taste and smell

Please also notify DeEtte Edens, BSN, RN, Associate Director of Health & Wellness, at dedens@southplainscollege.edu or 806-716-2376. Proof of a positive test is required. A home test is sufficient but students must submit a photo of the positive result. The date of test must be written on the test result and an ID included in the photo. If tested elsewhere (clinic, pharmacy, etc.), please submit a copy of the doctor's note or email notification. Results may be emailed to DeEtte Edens, BSN, RN at dedens@southplainscollege.edu.

A student is clear to return to class without further assessment from DeEtte Edens, BSN, RN if they have completed the 5-day isolation period, symptoms have improved, and they are without fever for 24 hours without the use of fever-reducing medication.

Students must communicate with DeEtte Edens, BSN, RN prior to their return date if still symptomatic at the end of the 5-day isolation.

Note: The instructor reserves the right to modify the course syllabus and policies, as well as notify students of any changes, at any point during the semester.

Calendar

Phys 1410

Spring 2023

Week	Monday		Wednesday	
	Readings	Topics	Readings	Topics
1	01/16	Martin Luther King Day – No Class	01/18	Course Intro – Blackboard, Mastering Physics
2	01/23 Ch2.1-7	Newton’s First Law of Motion – Inertia Lab – Scientific Notation, Units Conversion	01/25 Ch3.1-4	Linear Motion Lab – Carts on Tracks
3	01/30 Ch4.1-6	Newton’s Second Law of Motion Lab – Free Fall	02/01 Ch5.1-3	Newton’s Third Law of Motion Lab – Working with Newton’s Laws
4	02/06 Ch6.1-5	Momentum Lab – Momentum Conserved	02/08 Ch7.1-6	Energy Lab – Energy Conserved
5	02/13 Ch8.1-2, 4-8	Rotational Motion Lab – Feeling the Torque	02/15 Ch11.1-8	The Atomic Nature of Matter Lab – Sizes of Atoms
6	02/20	Review for Test 1	02/22	Test 1 9:30am – 11:30am
7	02/27 Ch19.1-5	Vibrations and Waves Lab – Simple Pendulum	03/01 Ch15.1-3 Ch17.5	Temperature, Heat, and Phase Changes Lab – Melting Ice
8	03/06 Ch22.1-9	Electrostatics Lab – Attraction and Repulsion	03/08 Ch23.1-8	Electric Current Lab – Simple Bulb Circuits
	03/13	Spring Break – No Class	03/15	Spring Break – No Class
9	03/20 Ch24.1-7	Magnetism Lab – Mapping Magnetic Field	03/22 Ch25.1-9	Electromagnetic Induction Lab – Faraday’s Law
10	03/27 Ch26.1-5	Properties of Light Lab – Electromagnetic Spectrum	03/29 Ch28.1-8	Reflection and Refraction of Light Lab – Image Formation with a Converging Lens
11	04/03	Review for Test 2	04/05	Test 2 9:30am – 11:30am
12	04/10 Ch29.1-5	Wave Behavior of Light – Diffraction, Interference, and Polarization Lab – Diffraction Grating	04/12 Ch30.1-7	Light Emission Lab – Emission Spectra
13	04/17 Ch31.1-8	Particle Behavior of Light Lab – Photoelectric Effect	04/19 Ch32.1-7	Structure of the Atom Lab – Electron Energy Levels and the Periodic Table
14	04/24 Ch33.1-9	The Atomic Nucleus and Radioactivity Lab – Get a Half-Life	04/26 Ch34.1-7	Energy from Nuclear Fission and Fusion Lab – Radiometric Dating
15	05/01 Ch35.1-9	Einstein’s Special Theory of Relativity	05/03	Review for Test 3
16	05/08	Test 3 10:15am – 12:15pm	05/10	

This schedule may be subject to change. Any necessary changes will be announced in class and through Blackboard.