

South Plains College
Common Course Syllabus: PHYS 1410
Revised 08/22/2022

Department: Science

Discipline: Physics

Course Number: PHYS 1410

Course Title: Elementary Physics

Available Formats: conventional

Campuses: Levelland

Instructor:

David Hobbs

Office: S67

Office Hours: MW 8:30 – 11:00 am, 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 as part of the SPC TexBook program. See details below.

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. Describe the different phases of matter from an atomic perspective
9. Describe how pressure relates to force and determine the pressure at different depths in a fluid
10. Define density and relate it to the buoyant force, applying Archimedes' Principle to solve problems
11. State the first law of thermodynamics and use it to solve simple problems involving energy transfers into or out of a system and changes in the system's internal energy
12. Discuss various means of heat transfer
13. Make simple calculations involving changes in temperature as well as phase changes when systems at different temperatures interact
14. State the second law of thermodynamics. Describe the basic functioning of a heat engine and calculate its efficiency
15. Describe and calculate basic properties of waves such as frequency, wavelength, and amplitude
16. Discuss wave interference and the conditions for constructive and destructive interference
17. Describe standing waves and determine the frequencies of the harmonics
18. Discuss electric charge and the role it plays in atomic structure.
19. Calculate electrical forces using Coulomb's law.
20. Describe electric field and discuss electrical interactions in terms of electric field.
21. Discuss simple electrical circuits and make calculations using Ohm's law applied to series and parallel circuits.
22. Describe magnetic field and discuss interactions of magnetic fields with moving charges.
23. Discuss and apply Faraday's law of electromagnetic induction
24. Relate changing magnetic fields to induced electric fields.
25. Describe electromagnetic waves in terms of electric and magnetic fields and electromagnetic induction
26. Discuss the spectrum of electromagnetic waves from radio waves to x-rays.
27. Discuss diffraction and interference and how they arise based on superposition and Huygens' Principle.
28. Make simple calculations related to the photoelectric effect and the Bohr model of the hydrogen atom
29. State the Pauli Exclusion Principle and specify its implications for atomic structure
30. Discuss how quantum mechanics explains the structure of the periodic table
31. Describe the basic structure of a nucleus and explain the meaning of different isotopes
32. Recall the three basic types of radioactivity and describe some properties of each

33. Use radioactive half-life in simple calculations
34. Describe the basic principles of radioactive dating
35. 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: Average reading quiz percentage \times 10 points

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.

TexBook Program: *This course is in the SPC TexBook program, so you do not need to purchase a textbook or access code for this course.*

- **What is TexBook?** The required textbook/digital content for this course is available to you in Blackboard from the first day of class. The charge for the textbook/digital content is the lowest price available from the publisher and bookstore and is included in your tuition.
- **How do I access my TexBook?** Your course material is in your Blackboard course from the first day of class. Access to your course material is provided either by VitalSource or other links inside your Blackboard course. VitalSource (and many publisher's) ebook features include the ability to hear the text read aloud, highlight, take notes, create flash cards, see word definitions, build study guides, print select pages, and download 100% of the book for offline access.
- **Help with TexBook issues and support:** check with your professor or visit: <https://support.vitalsource.com/hc/en-us/requests/new> (available 24/7 via chat, email, phone, and text)
- **Opting out of TexBook:** Participating in TexBook is not mandatory, and you can choose to opt out. However, by opting out you will lose access to the course textbook/digital content and competitive pricing, and you will need to purchase the required course material on your own. If you drop the class or opt-out before the opt-out deadline, the TexBook fee will be automatically refunded to your SPC account. The opt-out deadline for Fall and Spring is the twelfth class day. The opt-out deadline for shorter terms varies between the second and third class day.

Please consult with your professor before deciding to opt-out.* If you still feel that you should purchase the course textbook/materials on your own, send an **opt-out email to **tfewell4texasbookcompany@gmail.com**. Include your first name, last name, student ID number, and the course you are opting out of. Once you have been opted-out, you will receive a confirmation email. If you need assistance with the process, contact the SPC Bookstore:

Email: tfewell@texasbook.com / **Phone:** 806-716-2399

Email: agamble@texasbook.com / **Phone:** 806-716-4610

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 differences 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, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302.

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 Director of Health and Wellness. 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 Director of Health and Wellness at 806-716-2362 or email rcanon@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

Fall 2022

Week	Tuesday		Thursday	
	Readings	Topics	Readings	Topics
1	08/30	Course Intro – Blackboard, Mastering Physics	09/01 Ch1	About Science Lab – Earth/Moon Scale Model
2	09/06 Ch2	Newton’s First Law of Motion – Inertia Lab – Solar System Scale Model	09/08 Ch 3	Linear Motion Lab – Graphing Cart Motion
3	09/13 Ch4/Ch5	Newton’s Second and Third Laws of Motion Lab – Accelerating Carts	09/15 Ch6	Momentum Lab – Action/Reaction
4	09/20 Ch7	Energy Lab – Dropping the Ball	09/22 Ch8	Rotational Motion Lab – Feeling the Torque
5	09/27 Ch11/Ch12	The Atomic Nature of Matter, Solids Lab – Springy Behavior	09/29 Ch13/Ch14	Liquids and Gases Lab – To Float or Not to Float
6	10/04 Ch15/Ch16	Temperature, Heat, and Heat Transfer Review for Test 1	10/06	Test 1 – Chapters 1 through 8 and 11 through 14
7	10/11 Ch17	Change of Phase Discussion of Test 1 Results	10/13 Ch18	Thermodynamics Lab – Bouncing Off the Walls
8	10/18 Ch19	Vibrations and Waves Lab – Getting into the Swing of things	10/20 Ch22	Electrostatics Lab – Pith Ball Ping-Pong
9	10/25 Ch23	Electric Current Lab – Batteries and Bulbs	10/27 Ch24	Magnetism Lab – Seeing Magnetic Fields
10	11/01 Ch25	Electromagnetic Induction Lab – Bobbing for Magnets	11/03 Ch26/Ch28	Properties of Light; Reflection and Refraction Lab – Pixel Peeping
11	11/08 Ch29	Light Waves Review for Test 2	11/10	Test 2 – Chapters 15 through 19, 22 through 26, 28
12	11/15 Ch30	Light Emission Discussion of Test 2 Results	11/17 Ch31	Light Quanta Lab – Light Spectra
13	11/22 Ch32	The Atom and the Quantum No Lab due to Thanksgiving!	11/24	Thanksgiving – No Class
14	11/29 Ch33	The Atomic Nucleus and Radioactivity Lab – Get a Half-life	12/01 Ch34	Nuclear Fission and Fusion Lab – Build an Atom
15	12/06 Ch35	Special Theory of Relativity Lab – Trip to Alpha Centauri	12/08 Ch36	General Theory of Relativity Review for Test 3
16	12/13	Test 3 – Chapters 29 through 36 1 – 3 pm	12/15	

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