

South Plains College
Common Course Syllabus: PHYS 1410
Revised 01/11/2022

Department: Science

Discipline: Physics

Course Number: PHYS 1410

Course Title: Elementary Physics

Available Formats: conventional

Campuses: Levelland

Instructor:

David Hobbs

Office: S67

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

Phone: 806-716-2639

email: dhobbs@southplainscollege.edu

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: *The Physics of Everyday Phenomena, 10th Edition* by Thomas Griffith and Juliet Brosing (McGraw Hill, 2022). The textbook and Connect learning platform will be accessed 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, speed, velocity, and acceleration
2. Solve simple problems involving uniform motion and uniformly accelerated 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. Identify types of energy in a system and solve simple problems involving conservation of energy
6. Define momentum and solve simple problems involving conservation of momentum
7. 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
8. Discuss various means of heat transfer
9. Make simple calculations involving changes in temperature as well as phase changes when systems at different temperatures interact
10. State the second law of thermodynamics. Describe the basic functioning of a heat engine and calculate its efficiency.
11. Discuss electric charge and the role it plays in atomic structure.
12. Calculate electrical forces using Coulomb's law.
13. Describe electric field and discuss electrical interactions in terms of electric field.
14. Discuss simple electrical circuits and make calculations using Ohm's law applied to series and parallel circuits.
15. Describe magnetic field and discuss interactions of magnetic fields with moving charges.
16. Discuss and apply Faraday's law of electromagnetic induction
17. Describe and calculate basic properties of waves such as frequency, wavelength, and amplitude
18. Discuss wave interference and the conditions for constructive and destructive interference
19. Describe standing waves and determine the frequencies of the harmonics
20. Describe electromagnetic waves in terms of electric and magnetic fields and electromagnetic induction
21. Discuss the spectrum of electromagnetic waves from radio waves to x-rays
22. Discuss diffraction and interference and how they arise based on superposition
23. Explain polarization of light and the effects of polarizing filters
24. Describe the basic structure of an atom in terms of protons, neutrons, and electrons
25. Make simple calculations related to the Bohr model of the hydrogen atom
26. Discuss how quantum mechanics explains the structure of the periodic table
27. Describe the basic structure of a nucleus and explain the meaning of different isotopes
28. Recall the three basic types of radioactivity and describe some properties of each
29. Use radioactive half-life in simple calculations
30. Discuss the use of nuclear fission in electric power generation

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

Course Evaluation: Student grades will be based on daily work (class attendance and participation; reading, homework, and lab assignments) and five tests. Final grades will be assigned based on overall point total, using the point values shown below:

| Task | Code | Points |
|------------|------|--------|
| Daily Work | D | 20 |
| Tests | T | 80 |

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 assignments and both in-class (lab) and outside-of-class (homework) practice with feedback. These 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 will be determined as follows:

Attendance: 2 points if no more than two absences, 0 points otherwise

Reading: Unannounced reading quizzes, 2 points of the daily work grade

Homework: 8 points of the daily work grade

Lab: 8 points of the daily work grade

Tests: Five tests will be given during the semester as shown on the course calendar.

Students are required to take all five tests; however, the lowest test score will be dropped.

There will be no make-up tests given, so a test missed due to an excused absence will be the one dropped. A test missed because of an unexcused absence will receive a grade of zero and cannot be dropped. Absences on a test day must be approved before the class in order to be excused.

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 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 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 cgilster@southplainscollege.edu](mailto:cgilster@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 get tested 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.

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 2022

| Week | Monday | | Wednesday | |
|------|---|--|--------------------------|---|
| | Readings | Topics | Readings | Topics |
| 1 | 01/17 | Martin Luther King Day – No Class | 01/19 | Course Introduction |
| 2 | 01/24 Ch1 | The Practice of Science, Measurements, Scientific Notation | 01/26 Ch2.1-3 | Describing Motion: Speed, Velocity, Acceleration |
| 3 | 01/31 Ch2.4-5 | Graphing Motion, Uniformly Accelerated Motion | 02/02 Ch3 | Motion of a Dropped or Tossed Object |
| 4 | 02/07 Ch4.1-3 | Forces and Their Effect on Motion – Newton’s First and Second Laws of Motion | 02/09 Ch4.4-5 | Newton’s Third Law of Motion, Applying Newton’s Laws |
| 5 | 02/14 | Test 1 – Chapters 1 through 3 | 02/16 Ch6.1-3 | Work, Kinetic Energy, Potential Energy |
| 6 | 02/21 Ch6.4-5 | Conservation of Energy, Simple Harmonic Motion | 02/23 Ch7 | Impulse, Momentum, Conservation of Momentum |
| 7 | 02/28 Ch10.1-3 | Temperature, Heat, First Law of Thermodynamics | 03/02 Ch10.4-5 | Calorimetry, Heat Transfer Mechanisms |
| 8 | 03/07 | Test 2 – Chapters 4, 6, and 7 | 03/09 Ch11 | Second Law of Thermodynamics, Heat Engines |
| | 03/14 | Spring Break – No Class | 03/16 | Spring Break – No Class |
| 9 | 03/21 Ch12.1-3 | Electric Charge, Electrical Structure of Matter, Coulomb’s Law | 03/23 Ch12.4-5 | Electric Field, Electric Potential |
| 10 | 03/28 Ch13.1-3 | Electric Current, Resistance, Ohm’s Law, Simple Circuits | 03/30 Ch13.4-5 | Energy Transformations in Electric Circuits, Electrical Power Generation and Distribution |
| 11 | 04/04 | Test 3 Chapters 10 through 12 | 04/06 Ch14.1-3 | Magnets, Magnetic Field, Moving Electric Charge Produces Magnetic Field, Magnetic Force on Moving Charges |
| 12 | 04/11 Ch14.4-5 | Electromagnetic Induction, Generators, Transformers | 04/13 Ch15.1-3 | Wave Motion, Interference, Standing Waves |
| 13 | 04/18 Ch16.1-2 | Electromagnetic Waves and the Electromagnetic Spectrum | 04/20 Ch16.3-5 | Interference, Diffraction, and Polarization of Light Waves |
| 14 | 04/25 | Test 4 – Chapters 13 through 15 | 04/27 Ch18.1-3 | Discovery of the Structure of the Atom |
| 15 | 05/02 Ch18.4-5 Ch19.1 | Bohr Model of the Hydrogen Atom, Quantum Mechanical Explanation of the Periodic Table, Nuclear Structure | 05/04 Ch19.2-5 | Radioactive Decay, Fission, Fusion, Nuclear Power Generation |
| 16 | 05/09 | | 05/11 | Test 5 – Chapters 16, 18, and 19 |