

**South Plains College**  
**Common Course Syllabus: PHYS 2426**  
**Revised 12/11/2024**

**Department:** Science

**Discipline:** Physics

**Course Number:** PHYS 2426

**Course Title:** Principles of Physics II

**Available Formats:** conventional

**Campuses:** Levelland

**Instructor:**

David Hobbs

Office: S67

Office Hours: MW 1:00 – 2:00 pm, TT 1:30 – 3:30 pm, F 1:00 – 3:00 pm

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**Course Description:** Principles of physics for science, computer science, and engineering majors, using calculus, involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics. Laboratory experiments supporting theoretical principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics; experimental design, data collection and analysis, and preparation of laboratory reports.

**Prerequisite:** PHYS 2425 Principles of Physics I and MATH 2414 Calculus II

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

**Textbook:** *Physics for Scientists and Engineers, 5<sup>th</sup> edition* by Randall D. Knight (Pearson, 2022). The textbook and Mastering Physics learning platform will be available through Blackboard.

**Supplies:** Scientific Calculator

**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:**

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

1. Articulate the fundamental concepts of electricity and electromagnetism, including electrostatic potential energy, electrostatic potential, potential difference, magnetic field, induction, and Maxwell's Laws.
2. State the general nature of electrical forces and electrical charges, and their relationship to electrical current.
3. Solve problems involving the inter-relationship of electrical charges, electrical forces, and electrical fields.
4. Apply Kirchoff's Laws to analysis of circuits with potential sources, capacitance, and resistance, including parallel and series capacitance and resistance.
5. Calculate the force on a charged particle between plates of a parallel-plate capacitor.
6. Apply Ohm's law to the solution of problems.
7. Describe the effects of static charge on nearby materials in terms of Coulomb's Law.
8. Use Faraday's and Lenz's laws to find the electromotive forces.
9. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.
10. Articulate the principles of reflection, refraction, diffraction, interference and superposition of waves.
11. Solve real-world problems involving optics, lenses, and mirrors.

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

1. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.
2. Conduct basic laboratory experiments involving electricity and magnetism.
3. Relate physical observations and measurements involving electricity and magnetism to theoretical principles.
4. Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.
5. Design fundamental experiments involving principles of electricity and magnetism.
6. Identify appropriate sources of information for conducting laboratory experiments involving electricity and magnetism.

**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, 3 tests, and a comprehensive final exam. Final grades will be assigned based on the percentages shown below:

Task	Weight
Daily Work	25%
Tests	60%
Final Exam	15%

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.

**Late Work:** Late work will not be accepted.

**Extra Credit:** This course will not include any extra credit opportunities.

**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 with excessive absences (more than 5) will be administratively dropped from the class. It is the student's responsibility to know how many absences they have accumulated.

**Dropping a Course:** Students may drop courses through Texan Connect, the Admissions and Records Office, or Advising and Testing Center through the late registration period.

After late registration has closed, a student must complete the online [Student Initiated Drop Request](#) to drop a course.

Students may also drop courses in person at any campus location by completing a Student Initiated Drop Form. Complete a [Student Initiated Drop Form](#) and return the signed form to the Levelland Admissions and Records Office, the Student Support Center at the Lubbock Downtown Center, the Lubbock Career and Technical Center, or Plainview Center. You must have a picture ID to complete the drop.

A mark of "W" will be given for student-initiated drops that occur prior to and through the last day to drop as indicated in the online Academic Calendar found here:

<https://www.southplainscollege.edu/academiccalendar/index.php>.

**Daily Work:** Daily work consists of reading quizzes, in-class practice (problem solving sessions with feedback), and lab. 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, to prepare you for the tests, and provide opportunities to practice making experimental observations.

**Daily Work Grade Determination:** 15% of your daily work grade will come from the reading quizzes, 50% from problem solving sessions, and 35% from lab.

**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 with some detailed solutions written and handed in for review. A better semester average homework grade will replace your lowest test score. 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.

**Tests:** Three tests will be given during the semester as shown on the course calendar. Each test will be worth 20% of the course grade.

Make-up tests will be given only in extreme circumstances. The first missed test will be replaced by your semester average homework score. A second missed test can be made up only if both missed tests were due to serious unavoidable medical issues that were both properly documented – see below.

Missing a test should only be for serious unavoidable medical issues and should not be for trivial reasons. You should notify the instructor **before** the missed test, if at all possible. In any case, you must notify the instructor of the reason for missing the test within 24 hours of the test date.

Failure to make this notification means making up the test will not be allowed under any circumstances. Proper documentation must be provided before a make-up test will be scheduled.

**Final Exam:** The final exam will be a comprehensive exam. It will be given during the scheduled final exam time as shown on the course calendar.

### **Tips for Doing Well**

- Read “Preface to the Student” in the textbook. It’s written for you!
- Students who have never had a high school physics course must be extra diligent in keeping up with the material. Lots of new concepts are introduced in each chapter. Keep up with the homework and readings to avoid getting overwhelmed.
- Attend classes and ask questions. If you have a question from a previous class, send me a quick email ahead of the next class and I will endeavor to respond, as time permits.
- Read ahead each day. Frame questions from your readings.
- Do the homework. Homework helps you internalize what you are learning and gives practice. Don’t skimp! Students who try to get by without doing homework often fail the course. And your homework grade gives "insurance" against a low test grade.
- Time commitment. Learning physics is a time intensive process. Be sure to set aside enough time for both studying the textbook thoroughly and working homework. How much time you need will depend on your prior preparation. It’s probably fair to say that most students underestimate the time commitment needed to excel.
- Study together. Explaining your thought process to others is a great way to clarify your thinking. You are encouraged to discuss homework problems with your peers. However, homework solutions must be your own. You will learn almost nothing by just copying what everyone else is doing.
- Meet individually with me. Don’t hesitate to ask me for help. That’s my job! To facilitate the most effective help, bring a list of questions you have and any attempted work with you when meeting with me.
- Online resources. There is a plethora of online physics resources. Hyperphysics (<http://hyperphysics.phy-astr.gsu.edu/>) summarizes many course topics. Video tutorials can be viewed at Khan Academy (<https://www.khanacademy.org/science/physics>).

**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.

**Syllabus Statements:** For information about Artificial Intelligence, Disabilities, Non-Discrimination, Intellectual Exchange, Title IX Pregnancy Accommodations, CARE (Campus Assessment, Response, and Evaluation) Team, Campus Concealed Carry, and COVID-19, please use this link: <https://www.southplainscollege.edu/syllabusstatements/>.

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 2426

Spring 2025

Week	Monday		Wednesday	
	Readings	Topics	Readings	Topics
1	01/13 <b>Ch22</b>	Electric Charge, Coulomb's Law Lab 1 – Basic Observations in Electrostatics	01/15 <b>Ch22</b>	Electric Field PS1 – Electric Field of a Point Charge
2	01/20	Martin Luther King Day – No Class	01/22 <b>Ch23</b>	Superposition of Electric Fields, Field of an Electric Dipole PS2 – Using Superposition to Find $\vec{E}$
3	01/27 <b>Ch23</b>	Electric Field of Continuous Charge Distributions PS3 – Using Integration to Find $\vec{E}$	01/29 <b>Ch24</b>	Symmetry, Electric Flux, Gauss's Law PS4 – Electric Flux and Enclosed Charge
4	02/03 <b>Ch24</b>	Applying Gauss's Law PS5 – Finding $\vec{E}$ using Gauss's Law	02/05 <b>Ch25</b>	Electric Potential Energy, Electric Potential PS6 – Energy Conservation with $V$
5	02/10	<b>Test 1 Chapters 22-24</b>	02/12 <b>Ch25</b>	Superposition of Electric Potential PS7 – Using Integration to Find $V$
6	02/17 <b>Ch26</b>	Connecting Electric Field and Electric Potential PS8 – Finding $\Delta V$ from $\vec{E}$	02/19 <b>Ch26</b>	Capacitance, Energy Stored in an Electric Field PS9 – Finding $\vec{E}$ from $V$
7	02/24 <b>Ch27</b>	Electric Current, Establishing and Maintaining a Current PS10 – Surface Charge on Current-Carrying Wires	02/26 <b>Ch27</b>	Conductivity, Resistivity, Ohm's Law Lab 2 – Ohmic versus Non-Ohmic Devices
8	03/03 <b>Ch28</b>	Kirchhoff's Laws, Analysis of Simple Circuits Lab 3 – Simple DC Circuits	03/05 <b>Ch28</b>	Multi-loop Circuits, RC Circuit PS11 – Applying Kirchhoff's Laws
9	03/10	<b>Test 2 Chapters 25-28</b>	03/12 <b>Ch29</b>	Magnetic Field, Sources of Magnetic Field, Ampere's Law Lab 4 – RC Circuit
	03/17	Spring Break – No Class	03/19	Spring Break – No Class
10	03/24 <b>Ch29</b>	Forces and Torques Exerted by Magnetic Field, Magnetic Properties of Matter PS12 – Magnetic Field Calculations	03/26 <b>Ch30</b>	Induced Currents, Lenz's Law, Faraday's Law PS13 – Applying Faraday's Law
11	03/31 <b>Ch30</b>	Induced Fields, Inductors, LC and LR Circuits PS14 – LC and LR Circuits	04/02 <b>Ch31</b>	Electromagnetic Field, Maxwell's Equations PS15 – Applying Maxwell's Equations
12	04/07 <b>Ch31</b>	Electromagnetic Waves PS16 – Wave Properties	04/09 <b>Ch32</b>	AC Circuits – Phasors, RC Filter Circuits PS17 – Parallel RC Circuit
13	04/14 <b>Ch32</b>	Series RLC Circuit, Power in AC Circuits Lab 5 – Series RLC Circuit	04/16 <b>Ch33</b>	Interference of Light, Young's Double Slit, Diffraction Grating Lab 6 – Interference and Diffraction
14	04/21	<b>Test 3 Chapters 29-32</b>	04/23 <b>Ch33</b>	Single Slit Diffraction, Circular Aperture Diffraction PS18 – Spectroscopy with a Diffraction Grating
15	04/28 <b>Ch34</b>	Ray Optics -Reflection, Refraction PS19 - Refraction	04/30 <b>Ch34</b>	Ray Optics - Thin Lenses, Lens Maker's Equation Lab 7 – Thin Lenses
16	05/05	<b>Comprehensive Final Exam 1:00 – 3:00 pm</b>	05/07	

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