

South Plains College
Common Course Syllabus: PHYS 2425
Revised 01/11/2022

Department: Science

Discipline: Physics

Course Number: PHYS 2425

Course Title: Principles of Physics I

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: Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical mechanics, including harmonic motion, physical systems and thermodynamics; and emphasis on problem solving. Basic laboratory experiments supporting theoretical principles and applications of classical mechanics, including harmonic motion and physical systems; experimental design, data collection and analysis, and preparation of laboratory reports.

Prerequisite: MATH 2413 Calculus I

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

Textbook: *Physics for Scientists and Engineers, 5th edition* by Randall D. Knight (Pearson, 2022). The textbook and Mastering Physics learning platform will be accessed through Blackboard as part of the SPC TexBook program. See details below.

Supplies: Scientific Calculator, Laboratory Notebook (available from the bookstore)

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. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.
2. Solve problems involving forces and work.
3. Apply Newton's laws to physical problems.
4. Identify the different types of energy.
5. Solve problems using principles of conservation of energy.
6. Define the principles of impulse, momentum, and collisions.
7. Use principles of impulse and momentum to solve problems.
8. Determine the location of the center of mass and center of rotation for rigid bodies in motion.
9. Discuss rotational kinematics and dynamics and the relationship between linear and rotational motion.
10. Solve problems involving rotational and linear motion.
11. Define equilibrium, including the different types of equilibrium.
12. Discuss simple harmonic motion and its application to real-world problems.

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 classical mechanics.
3. Relate physical observations and measurements involving classical mechanics 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 classical mechanics.
6. Identify appropriate sources of information for conducting laboratory experiments involving classical mechanics.

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 (problem solving sessions and lab assignments), homework and tests, and a comprehensive final exam. Final grades will be assigned based on overall point total, using the point values shown below:

Task	Code	Points
Daily Work	D	20
HW & Tests	T	60
Final Exam	F	20

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 in-class practice with feedback (problem solving sessions 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 and maintaining a lab notebook.

Daily Work Grade Determination: Your daily work grade will be determined as follows:

Problem Solving Sessions: 10 points (13 sessions each receiving grade of 0 or 1)

Lab: Labs 1 and 2 one point each, lab 3 two points and labs 4 and 5 three points each

Example: You earn a grade of 1 on nine of the thirteen problem solving sessions, 1 on each of the first two labs, 1.5 on lab 3 and 2.5 on both of labs four and five. Your daily work grade would be

$$\text{daily work grade} = 9 + 1 + 1 + 1.5 + 2.5 + 2.5 = 17.5 \text{ points}$$

Homework: Do your homework! There is no substitute. Students who don't put in a good effort often fail the course. Homework will be assigned and graded online with detailed solutions written and handed in for review. Initial online scores may be adjusted after review of written solutions. Due dates will be posted in Mastering Physics and normally are one week after completion of each chapter. Late homework gets no credit! Homework will be scored uniformly for a maximum of 20 points (percentage of problems correct*20 points).

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

Final Exam: A comprehensive final exam will be given during the scheduled two-hour final exam time. The final exam is worth 20 points. See the course calendar for the day and time.

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

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, submitted written 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>).

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 2425.001

Spring 2022

Week	Tuesday		Thursday	
	Readings	Topics	Readings	Topics
1	01/18 Ch1	Concepts of Motion	01/20 Ch2.1-5	Kinematics in One Dimension Intro to Lab
2	01/25 Ch2.6-7	Free Fall, Motion with Changing Acceleration Problem Solving Session	01/27 Ch3	Vectors and Coordinate Systems Lab 1 – One Dimensional Motion
3	02/01 Ch4.1-3	Kinematics in Two Dimensions – Projectile Motion Problem Solving Session	02/03 Ch4.4-6	Kinematics in Two Dimensions – Uniform and Nonuniform Circular Motion Complete Lab 1
4	02/08 Ch5	Force and Motion – Newton’s First and Second Laws Problem Solving Session	02/10 Ch6.1-4	Dynamics of Motion in a Straight Line Lab 2 – Projectile Motion
5	02/15 Ch6.5-6	Dynamics of Motion in a Straight Line Problem Solving Session	02/17 Ch7	Newton’s Third Law; Dynamics of Interacting Objects Complete Lab 2
6	02/22 Ch8.1-3	Dynamics of Uniform Circular Motion Problem Solving Session	02/24	Test 1 Chapters 1 – 6
7	03/01 Ch8.4-5	Dynamics of Nonuniform Circular Motion Problem Solving Session	03/03 Ch9.1-4	Work and Kinetic Energy Lab 3 – Newton’s Second Law
8	03/08 Ch9.5-6 Ch10.1-3	Interactions and Potential Energy Problem Solving Session	03/10 Ch10.4-8	Conservation of Energy Complete Lab 3
	03/15	Spring Break – No Class	03/17	Spring Break – No Class
9	03/22 Ch11.1-4	Impulse and Momentum Problem Solving Session	03/24 Ch11.5-6	Conservation of Momentum Lab 4 – Ballistic Pendulum
10	03/29 Ch12.1-4	Rotational Energy and Moment of Inertia Problem Solving Session	03/31	Test 2 Chapters 7 – 11
11	04/05 Ch12.5-9	Torque and Rotational Dynamics Problem Solving Session	04/07 Ch12.10-12	Conservation of Angular Momentum Complete Lab 4
12	04/12 Ch13	Newton’s Universal Law of Gravity Problem Solving Session	04/14 Ch14	Fluids Lab 5 – Rotational Dynamics
13	04/19 Ch15	Oscillations Problem Solving Session	04/21 Ch18.1-4	Describing Matter – Density, Molar Mass, Temperature Complete Lab 5
14	04/26 Ch18.5-7	Describing Matter – Phase Changes, Ideal-Gas Processes Problem Solving Session	04/28	Test 3 Chapters 12 – 15
15	05/03 Ch19.1-4	First Law of Thermodynamics	05/05 Ch19.5-8	Calorimetry, Heat Transfer Mechanisms
16	05/10		05/12	Final Exam