

COLLIN COLLEGE
COURSE SYLLABUS

Course Information

Course Number: PHYS 2425

Course Title: University Physics I

Course Description: Lecture: Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical and modern mechanics, including harmonic motion, physical systems, and the laws of thermodynamics; and emphasis on problem solving. Lab: Basic laboratory experiments supporting theoretical principles presented in the lecture section involving the principles and applications of classical mechanics, including harmonic motion and physical systems; experimental design, data collection and analysis, and preparation of laboratory reports. Lab required.

Course Credit Hours: 4

Lecture Hours: 3

Lab Hours: 3

Prerequisite: MATH 2413 equivalent within the last five years with a grade of "C" or better

Prerequisite/Concurrent Enrollment: MATH 2414 equivalent

Student Learning Outcomes:

- **State-mandated Outcomes:** Upon successful completion of this course, students will:

Lecture

1. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration. (Critical Thinking; Empirical/Quantitative)
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.
13. Solve problems involving the First and Second Laws of Thermodynamics.

Lab

1. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner. (Communication Skills; Teamwork)
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.
- **Additional Collin Outcomes:**
 1. Use the basic SI units of measurement in problem solving.
 2. Solve problems involving the theoretical derivation of relationships and equations using calculus.
 3. Solve problems in kinematics and dynamics.
 4. Apply vector analysis to appropriate problems.
 5. Analyze and solve problems involving energy and work.
 6. Analyze and solve problems using the concepts of momentum and collisions.
 7. Solve problems involving the basic principles of fluid dynamics.
 8. Solve problems involving heat and the laws of thermodynamics.
 9. Explain and utilize the concepts of wave motion and sound
 10. Demonstrate the proper collection, analysis, and reporting of scientific data.

Withdrawal Policy: See the current *Collin Registration Guide* for last day to withdraw.

Collin College Academic Policies: See the current *Collin Student Handbook*.

Americans with Disabilities Act Statement: Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to contact the ACCESS office, SCC-D140 or 972.881.5898 (V/TTD: 972.881.5950) to arrange for appropriate accommodations. See the current *Collin Student Handbook* for additional information.