

**COLLIN COLLEGE**  
**COURSE SYLLABUS**

Course Information
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**Course Number:** PHYS 2426

**Course Title:** University Physics II

**Course Description:** Lecture: 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, optics, and modern physics. Lab: Laboratory experiments supporting theoretical principles presented in the lecture section involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics; 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 2414 equivalent, and PHYS 2425 within the last five years with a grade of “C” or better

**Student Learning Outcomes:**

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

Lecture

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. (Critical Thinking; Empirical/Quantitative)
4. Apply Kirchhoff’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 the 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

1. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner. (Communication Skills; Teamwork)
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.

- **Additional Collin Outcomes:** Upon successful completion of this course, students will:
  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 electricity and magnetism.
  4. Solve problems involving the relationship between electricity and magnetism using Maxwell's equations.
  5. Analyze and solve problems involving light.
  6. Analyze and solve problems using Einstein's Special Theory of Relativity.
  7. Solve problems involving the basic principles of photons and matter waves.
  8. Apply concepts from classical mechanics to topics covered in this course.
  9. 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.