

# COLLIN COLLEGE

## COURSE SYLLABUS

### Course Information

**Course Number:** PHYS 1402

**Course Title:** College Physics II

**Course Description:**

Lecture: Fundamental principles of physics, using algebra and trigonometry; the principles and applications of electricity and magnetism, including circuits, electrostatics, electromagnetism, waves, sound, light, optics, and modern physics topics; with emphasis on problem solving.

Lab: Laboratory activities will reinforce fundamental principles of physics, using algebra and trigonometry; the principles and applications of electricity and magnetism, including circuits, electrostatics, electromagnetism, waves, sound, light, optics, and modern physics topics; with emphasis on problem solving.

**Course Credit Hours:** 4

Lecture Hours: 3

Lab Hours: 3

**Prerequisite:** PHYS 1401

**Student Learning Outcomes:**

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

Lecture

1. Solve problems involving the inter-relationship of fundamental charged particles, and electrical forces, fields, and currents.
2. Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.
3. Solve problems in the electrostatic interaction of point charges through the application of Coulomb's Law.
4. Solve problems involving the effects of magnetic fields on moving charges or currents, and the relationship of magnetic fields to the currents which produce them.
5. Use Faraday's and Lenz's laws to determine electromotive forces and solve problems involving electromagnetic induction.
6. Articulate the principles of reflection, refraction, diffraction, interference, and superposition of waves.
7. Describe the characteristics of light and the electromagnetic spectrum.

Lab

1. Develop techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.
2. Demonstrate the collections, analysis, and reporting of data using the scientific method.
3. Record experimental work completely and accurately in laboratory notebooks, and communicate experimental results clearly in written reports.
4. Solve problems involving the inter-relationship of fundamental charged particles, and electrical forces, fields, and currents.
5. Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.
6. Solve problems in the electrostatic interaction of point charges through the application of Coulomb's Law.
7. Solve problems involving the effects of magnetic fields on moving charges or currents, and the relationship of magnetic fields to the currents which produce them.
8. Use Faraday's and Lenz's laws to determine electromotive forces and solve problems involving electromagnetic induction.
9. Solve problems applying the principles of reflection, refraction, diffraction, interference, and superposition of waves.
10. Solve practical problems involving optics, lenses, mirrors, and optical instruments.

- **Additional Collin Outcomes:**

1. Apply the concepts of static electrical charge to problems involving Coulomb's Law and electric fields (Critical Thinking; Empirical/Quantitative)
2. Solve problems involving the concepts of electrical potential energy, electrical potential energy difference, and potential
3. Apply the concepts of capacitance and electrical power by solving problems
4. Solve problems utilizing Ohm's Law and electrical resistance
5. Apply Kirchhoff's laws to electrical circuits
6. Apply the concepts of magnetism and electromagnetism to electrical circuits
7. Solve problems using the principles of alternating current
8. Understand and apply the principles of geometric optics

9. Explain and apply the concepts pertaining to optical instruments (Communication Skills; Teamwork)
10. Develop an understanding of the various applications of modern physics including: relativity, quantum theory, quantum mechanics, nuclear structure, radioactivity, and fission and fusion

**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.