

University of Arkansas - Fort Smith
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General Syllabus

PHYS 20431 University Physics II Laboratory

Credit Hours: 1

Lecture Hours: 0

Laboratory Hours: 2

Prerequisite: PHYS 20303/20331 University Physics I/Laboratory

Prerequisite or corequisite: PHYS 20403 University Physics II

Effective: 2018~2019

I. Course Information

A. Catalog Description

Included are basic experiments demonstrating physical principles of electricity, magnetism, and light.

B. Additional Information

This is the companion lab for PHYS 20203 University Physics II and provides the second four semester hours in a sequence of eight that majors in chemistry, engineering, math, and including some pre-professional fields, should take.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, a student will be able to:

1. Build a foundation to better understand the basic concepts of science.
2. Relate concepts to practical situations through the laboratory.
3. Relate mathematical quantities to aid in the understanding of the laws of science.
4. Manipulate various experimental apparatus.
5. Record measurement quantities from the apparatus.
6. Calculate required experimental quantities.
7. Explain calculated results in light of experimental values.
8. Write a clear lab report of each experiment.
9. Explain the nature of electric charges and use Coulomb's Law.
10. Use the concepts of the electric field and electric potential to describe the space around an electric charge.
11. Derive the expressions of Ohm's Law and Joule's Law by using the energy method.
12. Calculate components of electric circuits by using Kirchhoff's Law.

13. Describe the magnetic properties associated with moving charges.
14. Explain the processes used in electrical machines and devices in our society.
15. Show the relationship between electromagnetism and light.
16. Use the rules of geometrical optics to study reflection and refraction of light.
17. Calculate the relationship of waves to light.
18. Describe the applications of optics to common phenomena.

B. University Learning Outcomes

University Physics II Laboratory enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. The student will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

Communication Skills (written and oral)

Students will communicate proficiently. The student will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

Ethical Decision Making

Students will model ethical decision-making processes. The students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

Global & Cultural Perspectives

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. The students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

- A. Electric Fields and Equipotential
- B. Ohm's Law
- C. Measurement of Resistance: Voltmeter, Ammeter
- D. Measurement of Resistance: Wheatstone Bridge
- E. Construct a Voltmeter
- F. Construct an Ammeter
- G. Resistance in Series and Parallel
- H. Joule Heat
- I. The Charge on Electrons
- J. AC Circuits
- K. Reflection and Refraction

- L. Spherical Mirror
- M. Lenses
- N. The Prism Spectrometer
- O. The Diffraction Grating