University of Arkansas - Fort Smith
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General Syllabus

PHYS 20403 University Physics II

Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0

Prerequisite: PHYS 20303/20331 University Physics I/Laboratory
Prerequisite or corequisite: MATH 25004 Calculus II

Effective: 2018~2019

I. Course Information

A. Catalog Description

Continuation of University Physics I in which electric fields and DC circuits; magnetic fields, electromagnetic induction and AC circuits; oscillations and waves, Maxwell's equations; and geometrical and physical optics will be covered. (ACT 2044: must complete PHYS 2923 and PHYS 2931)

B. Additional Information

This course and its companion lab course provide the second four semester hours in a sequence of eight that majors in most biological fields, including pre-medical fields, should take. Majors in physics, chemistry, and engineering should take the eight hours of Engineering Physics.

II. Student Learning Outcomes

A. Subject Matter

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

1. 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. Explain the nature of electric charges and use Coulomb's Law.
5. Use the concepts of the electric field and electric potential to describe the space around an electric charge.
6. Derive the expressions of Ohm's Law and Joule's Law by using the energy method.
7. Calculate components of electric circuits by using Kirchoff's Law.
8. Describe the magnetic properties associated with moving charges.
9. Explain the processes used in electrical machines and devices in our society.

10. Show the relationship between electromagnetism and light.
11. Use the rules of geometrical optics to study reflection and refraction of light.
12. Calculate the relationship of waves to light.
13. Describe the applications of optics to common phenomena.

B. University Learning Outcomes

University Physics II 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 Charge
B. Coulomb's Law
C. Electric Field
D. Electric Energy
E. Electric Circuits
F. Electromagnetism
G. Applied Electricity
H. Electromagnetic Waves
I. Geometrical Optics
J. Wave Optics
K. Applied Optics