University of Arkansas - Fort Smith

5210 Grand Avenue

P. O. Box 3649

Fort Smith, AR 72913-3649

479-788-7000

General Syllabus

PHYS 2911 University Physics I Laboratory

Credit Hours: 1 Lecture Hours: 0 Laboratory Hours: 2

Prerequisite or corequisite: PHYS 2903 University Physics I

Effective: 2018~2019

I. Course Information

A. Catalog Description

Basic experiments demonstrating physical principles of mechanics, heat, thermodynamics, and wave motion.

B. Additional Information

This lab and its companion course provide the first four semester hours in a sequence of eight that majors in physics, chemistry, and engineering should take.

II. Student Learning Outcomes

A. Subject Matter

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

1. Manipulate various experimental apparatus.
2. Record measurement quantities from the apparatus.
3. Calculate required experimental quantities.
4. Explain calculated results in light of experimental values.
5. Write a clear lab report.
6. Explain the nature of physics.
7. Use and calculate the expressions for matter, density, and Avogadro's number.
8. Calculate the kinematics of motion.
9. Use and calculate the dynamics of motion.
10. Calculate the requirement for static equilibrium.
11. Explain and solve problems of conservation of momentum and energy.
12. Describe and calculate the requirements for rotational motion.

13. Calculate properties of elasticity and vibrating motion.
14. Explain and use properties of wave motion.
15. Solve problems with interference of waves.
16. Define and describe fluids and their properties.
17. Describe the properties of heat and temperature.

B. University Learning Outcomes

University Physics I 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. Experimental Error and Data Analysis
B. Mass, Volume, and Density
C. Addition and Resolution of Vectors: The Force Table
D. Uniformly Accelerated Motion (Free Fall)
E. Uniformly Accelerated Motion (Air Track)
F. Newton's Second Law: The Atwood Machine
G. Centripetal Force
H. Friction
I. The Ballistics Pendulum

J. Torques, Equilibrium, and Center of Gravity
K. Hook's Law and Simple Harmonic Motion
L. Air Column Resonance: The Speed of Sound in Air
M. The Temperature Coefficient of Linear Expansion
N. Specific Heat of Metal