

**University of Arkansas - Fort Smith
5210 Grand Avenue
P.O. Box 3649
Fort Smith, AR 72913
479-788-7000**

General Syllabus

PHYS 20103 College Physics I

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0 hours

Prerequisite: MATH 11003 College Algebra or higher-level math course or exemption by placement.

Effective Semester: 2025 - 2026

I. Course Information

A. Catalog Description

A fundamental course for students in pre-medicine, pre-dentistry, and other areas in which a basic introduction to mechanics, wave motion, sound, and heat is needed. (ACTS: PHYS 20103; must complete both PHYS 20103/20101)

B. Additional Information - None

II. Subject Learning Outcomes

A. Subject Matter

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

1. Explain the nature of physics.
2. Understand, calculate, and apply trigonometric expressions, especially related to angles and vectors.
3. Use and calculate the expressions for matter, density, and Avogadro's number.
4. Calculate the kinematics of motion.
5. Use and calculate the dynamics of motion.
6. Calculate the requirement for static equilibrium.
7. Explain and solve problems of conservation of momentum and energy.
8. Describe and calculate the requirements for rotational motion.
9. Calculate properties of elasticity and vibrating motion.
10. Explain and use properties of wave motion.

11. Solve problems with interference of waves.
12. Define and describe fluids and their properties.
13. Describe the properties of heat and temperature.

B. University Learning Outcomes

The student who completes this course will make progress toward attainment of the following outcomes:

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. The Nature of Physics
- B. Trigonometric concepts of angle calculations and vectors
- C. Structure and Properties of Matter
- D. Kinematics--The Description of Motion
- E. Dynamics
- F. Statics
- G. Conservation and Momentum of Energy
- H. Rotation
- I. Elasticity and Vibration
- J. Wave Motion
- K. Interference and Stationary Waves
- L. Fluids

M. Temperature and Expansion

N. Heat and Heat Transfer