

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

General Syllabus

PHYS 20303 University Physics I

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite or corequisite: Math 24004 Calculus I

Effective: 2018~2019

I. Course Information

A. Catalog Description

A calculus-based introductory physics course for scientists and engineers that covers Newton's laws of motion; conservation laws for momentum, energy, and angular momentum; fluid statics and dynamics; laws of thermodynamics. . (ACTS: PHYS 2034; must complete PHYS 2903/2911)

B. Additional Information

This course and its companion lab course provide the first half of an eight-hour sequence required for engineering and physics majors. It is also appropriate for chemistry majors.

II. Student Learning Outcomes

A. Subject Matter

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

1. Express quantities of measurement.
2. Explain and use vector algebra.
3. Solve problems of motion.
4. Explain and use expressions of particle dynamics.
5. Use and describe work and energy expressions.
6. Explain and solve problems of conservation of energy.
7. Solve expressions of conservation of linear momentum.
8. Calculate motions during and after collisions.
9. Express terms and determine facts of rotational motion.
10. Solve problems of rotational dynamics and conservation of angular momentum.
11. Solve problems of equilibrium of rigid bodies.
12. Solve the mathematical expression of oscillations.

B. University Learning Outcomes

This course 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. Measurement
- B. Vectors
- C. Motion in One Dimension
- D. Motion in a Plane
- E. Particle Dynamics
- F. Work and Energy
- G. Conservation of Energy
- H. Conservation of Linear Momentum
- I. Collisions
- J. Rotational Kinematics
- K. Rotational Dynamics and Conservation of Angular Momentum
- L. Equilibrium of Rigid Bodies
- M. Oscillation