

JEFFERSON COLLEGE

COURSE SYLLABUS

PHY223

GENERAL PHYSICS I

5 Credit Hours

Prepared by:
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Revised by: Dr. Bob Brazzle
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Minor Revision or Update by: Fran Moore
Per Curriculum Committee Process Change: April 25, 2018

Ms. Linda Abernathy, Division Chair, Math, Science, & Business
Ms. Shirley Davenport, Dean, Arts & Science Education

PHY223 General Physics I

I. CATALOG DESCRIPTION

- A. Pre-requisite and/or Co-requisites: MTH180—MTH180 may be taken concurrently with ACT Math score of 30 or higher (SAT math score of 670 or higher), or at least a 3 on the AP Calculus “AB” exam
- B. 5 semester credit hours
- C. General Physics I is the first course in the physics sequence for all physics, chemistry, mathematics, and pre-engineering majors and is a rigorous study of topics in kinematics, dynamics and thermodynamics. Laboratory time is required. This course is required for the Associate of Science degree. This course meets the computer literacy requirement for degree-seeking students. (F, S)
- D. Curricular alignment:
- Fulfills part of Natural Sciences (Physical Sciences) with lab CORE requirement for AA, AAT, AFA, AS, and select AAS degrees: MOTR PHYS 200L Advanced Physics I with Lab
 - Elective course applies toward AA or AAT degree.

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Gain experience using an authentic scientific inquiry process	Classroom discussions, homework, labs, exams
Understand the basic laws and principles of physics	Classroom discussions, homework, labs, exams
Interpret and analyze physical problems	Classroom discussions, homework, labs, exams
Use experimental techniques and technology to analyze physical problems	Laboratories and lab write-ups
Learn the various mathematical methods used in the solution of problems	Classroom discussions, homework, labs, exams

III. OUTLINE OF TOPICS

- A. The scientific modeling process
1. Developing trigonometric models to solve basic physical problems
 2. Introduction to data acquisition devices and Microsoft Office Software
 3. Graphical analysis of linear, power law and exponential relationships
- B. Kinematics
1. Analyze one-dimensional motion
 2. Perform an analysis of projectile motion

- C. Dynamics
 - 1. Discuss Newton's Laws
 - 2. Solve physical problems using Newton's Laws and free body diagrams
 - 3. Solve problems involving circular motion and centripetal force

- D. Momentum
 - 1. Explain one-dimensional conservation of momentum
 - 2. Interpret two-dimensional conservation of momentum

- E. Work and energy
 - 1. Elucidate the work-energy principle
 - 2. Derive potential energy from the work-energy principle
 - 3. Contrast conservative and non-conservative forces
 - 4. Understand when conservation of energy is valid

- F. Angular motion
 - 1. Infer the rotational equations of motion
 - 2. Solve problems involving torque
 - 3. Describe the moment of inertia
 - 4. Compare angular momentum to linear momentum
 - 5. Give examples of rotational kinetic energy

- G. Periodic motion
 - 1. Distinguish between amplitude, period, and frequency
 - 2. Define harmonic motion
 - 3. Perform an analysis on the motion of a pendulum

- H. Thermodynamics
 - 1. Define internal energy and temperature
 - 2. Interpret the first law of thermodynamics
 - 3. Explain the concept of entropy using statistical mechanics principles
 - 4. Summarize the second law of thermodynamics

IV. METHODS OF INSTRUCTION

- A. Lecture
- B. Classroom discussion
- C. Homework
- D. Laboratories

V. REQUIRED TEXTBOOK

Sears and Zemansky/Young and Freedman; *University Physics* (current edition).
Boston: Pearson.

VI. REQUIRED MATERIALS

Calculator and a flash drive

VII. SUPPLEMENTAL REFERENCES

No supplemental references required

VIII. METHODS OF EVALUATION

A. Examinations

B. Required homework; some homework may be evaluated using the online service *Mastering Physics* linked through Blackboard

C. Lab write-ups. Students are also graded on spelling and grammar.

D. The computer literacy requirement is evaluated by Physics students demonstrating proficiency in coherently linking data acquisition devices, spreadsheets and word processing software during laboratory investigations and their subsequent write-ups. Occasionally, classroom or laboratory studies require that students access Jefferson College library electronic databases, LibGuides, or the Internet.

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (TC 101; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.