JEFFERSON COLLEGE

COURSE SYLLABUS

PHY223

GENERAL PHYSICS I

4 Credit Hours

Prepared by: Cliff Castle

Revised Date: January, 2009
by
Cliff Castle

Arts & Science Education
Dr. Mindy Selsor, Dean
PHY223 General Physics I

I. CATALOG DESCRIPTION

A. Prerequisites: PHY118 and MTH180

B. 4 semester hours credit

C. General Physics I is the second course in the physics sequence for all physics, chemistry, mathematics, and pre-engineering majors and is a rigorous study of topics in kinematics, dynamics, fluid mechanics, and thermodynamics. The class consists of three hours of lecture and two hours of lab per week. This course is required for the Associate of Science degree. This course meets the computer literacy requirement for degree-seeking students. (F)

II. EXPECTED LEARNING OUTCOMES/ASSESSMENT MEASURES

| Develop a knowledge of the fundamental nomenclature of physics | Classroom discussions, homework, labs, exams. |
| Understand the basic laws and principles of physics | Classroom discussions, homework, labs, exams. |
| Interpret and analyze a given problem | Classroom discussions, homework, labs, exams. |
| Use experimental techniques to analyze a problem | Laboratories |
| Learn the various mathematical methods used in the solution of problems | Classroom discussions, homework, labs, exams. |

III. COURSE OUTLINE WITH UNIT OBJECTIVES

A. Kinematics
   1. Analyze one-dimensional motion
   2. Perform an analysis of projectile motion

B. Dynamics
   1. Discuss Newton's Laws
   2. Practice Free Body Diagrams
   3. Contrast Centripetal and Centrifugal Force

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

E. Angular Motion
   1. Infer the rotational equations of motion
   2. Understand torque
   3. Restate the Moment of Inertia
   4. Compare Angular Momentum to Linear Momentum
   5. Give examples of Rotational Kinetic Energy

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

G. Fluid Mechanics
   1. State the Gas Laws
   2. Describe Archimedes' Principle
   3. Describe Bernoulli's Principle
   4. Describe Stoke's Law

H. Thermodynamics
   1. Convert from one temperature scale to another
   2. Define Internal Energy
   3. Interpret First Law of Thermodynamics
   4. Paraphrase the concept of Entropy
   5. Summarize the Second Law of Thermodynamics

IV. METHODS OF INSTRUCTION
A. Lecture
B. Classroom Discussion
C. Homework
D. Laborities

V. REQUIRED TEXTBOOK (with publication information)

Tipler/Mosca; Physics for Scientists and Engineers, Standard Version, (most recent edition), Freeman, and Physics Software Guide.
VI. REQUIRED MATERIALS

Calculator and flash drive

VII. SUPPLEMENTAL REFERENCES

None

VIII. METHOD OF EVALUATION

A. Required Homework

B. Lab Write-ups

C. Examinations

D. Perform simple computer operations: Physics students must show proficiency in using word processing, spreadsheet, and the usage of MathCad.

E. Complete basic word processor operations: Students use the Equation Editor and must import spreadsheet calculations into the word processor. Students are also graded on spelling and grammar.

F. Access and use electronic information including the Jefferson College library electronic data bases and the Internet, including but not limited to Jefferson College’s electronic services (STARS): An assignment is made in which students must find a recent engineering article and an older physics article. They are given a journal title for one and not the other. Information is also found on the Internet.

IX. ADA STATEMENT

Any statement requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-797-3000, ext. 169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College Website).