PHYS 1 Course Outline as of Fall 1999

CATALOG INFORMATION

Dept and Nbr: PHYS 1 Title: INTRO PBLM SOLVING
Full Title: Introduction to Physics Problem Solving
Last Reviewed: 8/26/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
An introduction to some basic concepts in physics with emphasis on the development of problem solving skills. This course is designed to assist students in preparing for enrollment in Physics 2A or Physics 4A.

Prerequisites/Corequisites:
Math 155. Credit will not be granted to students who have completed Phys 2A, Phys 4A, or equivalent.

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to basic concepts in physics with emphasis on problem solving skills. Assists students in preparing for PHYS 2A or 4A. (Grade or P/NP)
Prerequisites/Corequisites: Math 155. Credit will not be granted to students who have completed Phys 2A, Phys 4A, or equivalent.
Recommended:

Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 1994	
	MC	Math Competency	Fall 1981	Fall 2009
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B1	Physical Science	Fall 1996	
IGETC:	**Transfer Area**		Effective:	Inactive:

CSU Transfer:	Transferable	Effective:	Fall 1994	Inactive:
UC Transfer:	Transferable	Effective:	Fall 1994	Inactive:

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of the course, the student should be able to:
1. State the SI units for length, time and mass, identify the powers of ten associated with the most common metric prefixes and change a quantity from one set of units to another.
2. Define the concepts of displacement, velocity and acceleration; sketch graphs of displacement, velocity and acceleration versus time given a description of a motion; and describe the motion from graphs of displacement velocity and acceleration.
3. Use graphs of displacement velocity and acceleration versus time to determine changes in these quantities and instantaneous and average values of these quantities, including determining slopes of graphs and areas under graphs.
4. Solve problems involving uniformly accelerated motion in one dimension.
5. Explain the difference between scalar and vector quantities and give examples of each.
6. Use trigonometric functions to determine components of vectors and use vector addition methods to determine the sum of two or more vectors.
7. Define the concepts of force and mass, explain the difference between weight and mass, and give the units for force and weight.
8. Construct free body diagrams showing forces acting on objects.
9. Use Newton's second law to solve problems involving the acceleration of masses with one or more forces acting on them.
10. Define torque, give units for torque, find the torque produced by

a force about a designated point, and solve problems involving objects in static equilibrium.
11. Define the concepts of work, energy, potential energy and kinetic energy and give units in which they are expressed.
12. Determine the work done by a force by using the component of the force in the direction of motion and the distance moved by finding the area under a force versus displacement graph.
13. State the principle of conservation of energy and use the principle to solve problems.
14. Solve problems involving sound levels in decibels.
15. Define the concepts of heat, specific heat and latent heat and use the concepts in solving calorimetry/first law of thermodynamics problems.
16. Define the concepts of electrical current, voltage and resistance and give units used to express each of these quantities.
17. Determine the equivalent resistance of combinations of resistors in series and parallel, use Ohm's law to solve problems involving simple circuits.
18. State Kirchhoff's first and second rules and use them to solve circuit problems by writing simultaneous equations for circuits including two or more loops and by solving the equations using Cramer's rule.

Topics and Scope:

Topics Covered Include:
1. The international system (SI) units
   a. Units for length, time and mass
   b. Common metric prefixes
2. Conversion of units
3. One dimensional motion--position, velocity, acceleration
   a. Concepts of displacement, velocity and acceleration
   b. Graphs of displacement, velocity and acceleration versus time
   c. Slopes of displacement and velocity versus time graphs and areas under velocity and acceleration versus time graphs
4. Uniformly accelerated motion in one dimension
   a. Equations for uniformly accelerated motion
   b. Solutions of uniformly accelerated motion problems
5. Vectors--components, vector sums
   a. Scalar and vector quantities
   b. Components of vectors
   c. Sums of vectors
6. Forces--free body diagrams, Newton's second law of motion
   a. Concepts of mass, force and weight and units for force and weight
   b. Construction of free body diagrams
   c. Newton's laws of motion and application of Newton's second law of motion
7. Torque and Equilibrium
   a. Concept of torque and units for torque
   b. Solving static equilibrium problems
8. Work, energy and the principle of conservation of energy

a. Concepts of work, energy, kinetic energy and potential energy and work/energy units
b. Calculation of work done using force and displacement and by area under force-displacement graph
c. The principle of conservation of energy and its application

9. Sound waves and sound levels in decibels
   a. Concepts of sound waves, intensity of waves and sound intensity level in decibels
   b. Calculations of sound levels in decibels
10. Specific heats, latent heats, and the first law of thermodynamics
   a. Concepts of heat, specific heat, latent heats of fusion and vaporization
   b. Solving calorimetry/first law of thermodynamics problems
11. Electrical current, voltage, resistance, and Ohm's law
   a. Concepts of electrical current, voltage and resistance and units for current, voltage and resistance
   b. Ohm's law
12. Electrical circuits--Kirchhoff's first and second rules
   a. Equivalent resistance of combinations of resistances in series and parallel
   b. Application of Ohm's law to simple circuits
   c. Kirchhoff's first and second rules and application to circuits of two or more loops

Assignment:

1. No less than 20 sets of homework problems.
2. No less than 2 mid-term exams
3. Final exam

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Exams	Problem solving 33 - 67%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, Physics Problems to Solve	Exams 33 - 67%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Alan VanHeuvelen. Physics--A General Introduction. Little Brown. 1986
Rodney Cole. So You Want To Take Physics: A Preparatory Course. Saunders. 1993