Course Outline

COURSE: PHYS 2A      DIVISION: 10      ALSO LISTED AS:

TERM EFFECTIVE: Spring 2018      CURRICULUM APPROVAL DATE: 09/25/2017

SHORT TITLE: GENERAL PHYSICS I

LONG TITLE: General Physics I

<table>
<thead>
<tr>
<th>Units</th>
<th>Number of Weeks</th>
<th>Contact Hours/Week</th>
<th>Total Contact Hours</th>
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<tbody>
<tr>
<td>4</td>
<td>18</td>
<td>Lecture: 3</td>
<td>Lecture: 54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab: 3</td>
<td>Lab: 54</td>
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<tr>
<td></td>
<td></td>
<td>Other: 0</td>
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<td>Total: 6</td>
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COURSE DESCRIPTION:

An introduction to the principles of physics using algebra and trigonometry. Topics include kinematics in one and two dimensions, vectors, equilibrium and non-equilibrium applications of Newton's Laws, work and energy, momentum, rotational kinematics and dynamics, simple harmonic motion, elasticity, thermal physics, thermodynamics, and waves. (C-ID: PHYS 105), (C-ID: PHYS 100S: Phys 2A + Phys 2B)

PREREQUISITE: MATH 8A  ADVISORY: Eligible for English 250 and English 260.

PREREQUISITES:

Completion of MATH 8A, as UG, with a grade of C or better.
OR
Completion of MATH 1A, as UG, with a grade of C or better.
OR
Completion of MATH 1B, as UG, with a grade of C or better.
OR
Completion of MATH 1C, as UG, with a grade of C or better.
OR
Completion of MATH 2, as UG, with a grade of C or better.
OR
Completion of MATH 2C, as UG, with a grade of C or better.
OR
Score of 28 on Pre-Calculus
OR
Score of 2900 on Accuplacer Math

COREQUISITES:
CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES
   L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:
   02 - Lecture and/or discussion
   03 - Lecture/Laboratory
   04 - Laboratory/Studio/Activity

STUDENT LEARNING OUTCOMES:
1. Identify, describe, compare and contrast the various units of numbers and their significance.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2013
2. Describe vectors and their manipulation and use them as problem solving tools.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2018
   Semester: Fall
3. Identify, describe, compare and contrast distance, displacement, speed, velocity and acceleration.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2018
   Semester: Fall
4. Identify, describe, compare and contrast various forces, Newton's Laws, conservation of momentum, conservation of energy, power and work.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2018
   Semester: Fall
5. Identify, describe, compare and contrast rotational kinematics and dynamics.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2013
6. Identify and describe simple harmonic motion.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2014
7. Identify, describe, compare and contrast longitudinal, transverse and sound waves.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2014
8. Identify, describe, compare and contrast temperature, heat energy, heat transfer, and the first and second laws of thermodynamics.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2018
   Semester: Fall
9. Identify and describe the role of mathematics as a tool to describe the physical world.
   Measure of assessment: Exam, Lab
   Year assessed, or planned year of assessment: 2014

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

9/28/2017
Curriculum Approval Date: 09/25/2017

Hours
3 Lec/3 Lab
Content: Introduction, numbers and units, math review.

Out of Class Assignments: Reading and homework problems from text.
Student Performance Objectives: Identify and discuss the significance of units of various quantities, convert between systems of units, solve equations with one or two variables, solve right triangles.
Lab: Math review.

Hours
3 Lec/3 Lab
Content: One-dimensional kinematics.
Out of Class Assignments: Reading and homework from text.
Student Performance Objectives: Identify, compare and contrast distance, displacement, speed, velocity and acceleration. Identify, set-up and solve one dimensional kinematics problems.
Lab: Free-fall determination of g.

Hours
6 Lec/6 Lab
Content: Vector analysis. Two dimensional kinematics.
Out of Class Assignments: Problems and reading from the text.
Student Performance Objectives: Identify, describe and find the components of a vector. Identify, set-up, and solve two-dimensional kinematics problems.
Lab: Projectile motion.

Hours
6 Lec/6 Lab
Out of Class Assignments: Reading and problems for text.
Student Performance Objectives: Discuss, compare and contrast Newton's Laws and apply Newton's Second Law to accelerating and non-accelerating systems. Construct an accurate free-body diagram. Identify, set-up and solve problems involving Newton's Laws.
Lab: Acceleration of a system subjected to unbalanced forces.

Hours
3 Lec/3 Lab
Content: Uniform circular motion.
Out of Class Assignments: Reading and problems from text.
Student Performance Objectives: Identify and include centripetal forces in the set-up and solution of problems involving Newton's Laws.
Lab: Centripetal acceleration.

Hours
6 Lec/6 Lab
Content: Work and Energy.
Out of Class Assignments: Problems and reading from text.
Student Performance Objectives: Discuss and describe the principle of conservation of energy, compare and contrast potential and kinetic energy, discuss work done by conservative and non-conservative forces. Identify, set-up and solve energy problems using the work-energy theorem.
Lab: Conservation of energy.

Hours
3 Lec/3 Lab
Content: Momentum.
Out of Class Assignments: Reading and problems from text.
Student Performance Objectives: Discuss the impulse-momentum theorem, the principle of conservation of momentum, and compare and contrast elastic and inelastic collisions. Identify, set-up, and solve problems using the impulse-momentum theorem.
Lab: Conservation of momentum.
Hours
3 Lec/3 Lab
Content: Rotational kinematics.
Out of Class Assignments: Problems and reading from the text.
Student Performance Objectives: Discuss, compare and contrast rotational kinematics with one-dimensional kinematics. Identify, set-up, and solve rotational kinematics problems.
Lab: Angular acceleration of rotating objects.
Hours
3 Lec/3 Lab
Content: Rotational dynamics.
Out of Class Assignments: Reading and problems from text.
Student Performance Objectives: Discuss, compare and contrast torque and force, application of Newton's Laws to rotating systems, and conservation of energy and momentum for rotating systems. Identify, set-up, and solve problems using Newton's Laws and conservation of energy and momentum for rotating systems.
Lab: Equilibrium of a rigid bar subjected to torques.
Hours
3 Lec/3 Lab
Content: Spring forces and elasticity.
Out of Class Assignments: Problems and reading from text.
Student Performance Objectives: Students will identify and include forces due to springs in the set-up and solution of problems using Newton's Laws. Students will discuss, compare and contrast stress, strain, and the elastic moduli of materials. Students will identify, set-up and solve simple harmonic motion and elasticity problems.
Lab: Determine the spring constant of a spring.
Hours
3 Lec/3 Lab
Content: Fluids.
Out of Class Assignments: Reading and problems from text.
Student Performance Objectives: Identify, discuss, compare and contrast solids, liquids and vapors, the properties of liquids and gases in terms of density, velocity and pressure. Identify, set-up and solve problems using Bernoulli's equation and Archimedes principle. Compare and contrast Archimedes principle and Newton's Second Law. Identify, set-up and solve fluids problems.
Lab: Pressure/velocity relationship in a moving fluid.
Hours
6 Lec/6 Lab
Content: Oscillations and Waves
Out of Class Assignments: Problems and reading from the text.
Student Performance Objectives: Identify, describe, compare and contrast simple harmonic motion, uniform circular motion, and pendulum motion. Identify and describe conservation of energy in oscillating systems. Identify, set-up, and solve oscillation problems. Identify, discuss, compare and contrast transverse and longitudinal waves, sound waves, interference and superposition of waves, diffraction, and standing waves. Identify, set-up, and solve wave problems.
Lab: Pendulum motion.

9/28/2017
Hours
4 Lec/3 Lab
Content: Thermal Physics
Out of Class Assignments: Reading and problems from the text.
Student Performance Objectives: Identify and apply the principles of thermal physics to the solution of quantitative problems.

METHODS OF INSTRUCTION:
Lecture/discussion. Laboratory exercises. Group projects.

OUT OF CLASS ASSIGNMENTS:
Required Outside Hours: 64
Assignment Description: Regularly assigned homework that requires students to analyze and study pertinent text material, solved examples and lecture notes.
Required Outside Hours: 64
Assignment Description: Regularly assigned homework that requires students to apply the principles and skills covered in class by solving related problems.

METHODS OF EVALUATION:
Writing assignments
Percent of total grade: 20.00 %
Lab Reports.
Problem-solving assignments
Percent of total grade: 20.00 %
Homework, quizzes, projects.
Objective examinations
Percent of total grade: 60.00 %

REPRESENTATIVE TEXTBOOKS:
Required Representative Textbooks
Reading Level of Text, Grade: 12 Verified by: Jennifer Nari

ARTICULATION and CERTIFICATE INFORMATION
Associate Degree:
GAV B1, effective 201430
GAV B3, effective 201430
CSU GE:
CSU B1, effective 201430
CSU B3, effective 201430
IGETC:
IGETC 5A, effective 201430
IGETC 5C, effective 201430
CSU TRANSFER:
Transferable CSU, effective 201430
UC TRANSFER:
SUPPLEMENTAL DATA:
Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN: PHYS2
CAN Sequence: PHYS SEQ A
CSU Crosswalk Course Department: PHYS
CSU Crosswalk Course Number: 2A
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000089182
Sports/Physical Education Course: N
Taxonomy of Program: 190200