

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

Units	Number of Weeks		Contact Hours/Week		Total Contact Hours
4	18	Lecture:	3	Lecture:	54
		Lab:	3	Lab:	54
		Other:	0	Other:	0
		Total:	6	Total:	108

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

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

Content: Forces. Newton's Laws.

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.

9/28/2017

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.

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.

Hours

2

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

Cutnell, Johnson, Young, Stadler. Physics. Wiley,2014.

ISBN: ISBN-10: 1118486897

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:

Transferable UC, effective 201430

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