

Course Outline

COURSE: PHYS 1 **DIVISION:** 10 **ALSO LISTED AS:**

TERM EFFECTIVE: Summer 2020 **CURRICULUM APPROVAL DATE:** 05/12/2020

SHORT TITLE: INTRO TO PHYSICS

LONG TITLE: Introduction to Physics

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

COURSE DESCRIPTION:

This course is an introduction to the fundamental physical principles that control the world around us. Students will explore the fundamental principles of physics, their historical development, their application to everyday phenomena, and their impact upon political, social, and environmental issues. Laboratory exercises will explore the everyday world. **ADVISORY:** Mathematics 430 or skills equivalent to those in an Elementary Algebra course.

PREREQUISITES:

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
- 047 - Laboratory - LEH 0.7
- 05 - Hybrid
- 72 - Dist. Ed Internet Delayed
- 73 - Dist. Ed Internet Delayed LAB

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Identify, describe, compare and contrast the various units of numbers and their significance.
2. Identify, describe, compare and contrast random and systematic errors.
3. Describe the Scientific Method.
4. Identify, describe, compare and contrast distance, displacement, speed, velocity and acceleration.
5. Identify, describe, compare and contrast forces, Newton's Laws, conservation of momentum, conservation of energy, power, and work.
6. Describe the structure of an atom.
7. Identify, describe, compare and contrast the structure of and differences between various states of matter.
8. Describe, compare and contrast temperature, heat energy, heat transfer, and the first and second Laws of Thermodynamics.
9. Describe, identify, compare and contrast longitudinal, transverse, sound, and light waves.
10. Describe, compare and contrast electric and magnetic fields, resistance, current, and voltage.

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

Curriculum Approval Date: 05/12/2020

3 lecture/3 lab Hours

CONTENT: Introduction, current issues, numbers, units, and error analysis. Lab: Measurements, perception, and errors.

STUDENT

PERFORMANCE OBJECTIVES (SPO): The students will be able to identify and discuss the significance of units of various quantities, convert between systems of units, and analyze the various sources of error and their significance.

OUT-OF-CLASS ASSIGNMENTS: Reading and problems from the text.

6 lecture/6 lab Hours

CONTENT: One-dimensional motion. Lab: Acceleration of a vehicle.

SPO: The students

will be able to identify, compare, and contrast distance, displacement, speed, velocity, acceleration, vectors, and scalars.

OUT-OF-CLASS ASSIGNMENTS: Reading and problems from the text.

6 lecture/6

lab Hours

CONTENT: Forces and Newton's Laws. Lab: Speed of traffic on Santa Teresa Blvd.

SPO: The students will be able to discuss Newton's Laws and apply Newton's second law to accelerating and

non-accelerating systems. The students will be able to identify, discuss, and describe the conditions for free-fall, the conditions for static and kinetic friction, the coefficients of friction, and the nature of air resistance.

OUT-OF-CLASS ASSIGNMENTS: Reading and problems from text.

6 lecture/6 lab Hours

CONTENT: Work, energy, power, and simple machines. Momentum. Lab: Food requirements for physical tasks.

SPO: Students will be able to discuss and describe the principle of conservation of energy, compare and contrast potential and kinetic energy, discuss work and power, and discuss and compare and contrast efficiency, mechanical advantage and types of simple machines. Students will be able to discuss the Impulse-Momentum Theorem, the principle of conservation of momentum, and compare and contrast elastic and inelastic collisions.

OUT-OF-CLASS ASSIGNMENTS: Reading and problems from the text.

3 lecture/3 lab Hours

CONTENT: Rotational and projectile motion. Lab: Force between masses.

SPO: Students will be able to discuss, compare and contrast the important parameters that characterize one-dimensional, two-dimensional, and rotational motion. Students will be able to describe and identify torques, conservation of energy and conservation of momentum in rotational motion.

OUT-OF-CLASS ASSIGNMENTS: Reading and problems from text.

3 lecture/3 lab Hours

CONTENT:

Solids, liquids and vapors. Lab: Bridge building.

SPO: Students will be able to compare and contrast solids, liquids, and vapors. Discuss stress, strain, and the elastic moduli of materials.

Discuss the properties of liquids and vapors in terms of density, velocity, and pressure. Apply, compare, and contrast Bernoulli's theorem, Pascal's principle, and Archimede's principle.

OUT-OF-CLASS

ASSIGNMENTS: Problems and reading from text.

6 lecture/6 lab Hours

CONTENT: Temperature, thermal energy, and thermodynamics. Lab: Bridge building; oral presentation and competition.

SPO: Students

will be able to discuss, compare and contrast temperature and heat. Discuss the variables which control the physical behavior of vapors. Discuss, compare and contrast the mechanisms of heat transfer.

Discuss thermal equilibrium and phase changes. Students will be able to discuss, compare and contrast the First and Second Laws of Thermodynamics, heat engines, and the conservation of energy.

OUT-OF-CLASS ASSIGNMENTS: Problems and reading from text.

3 lecture/3 lab Hours

CONTENT: Waves. Lab: Final Project.

SPO: Students will be able to discuss, compare and contrast the properties of waves. Discuss the potential energy of a spring, oscillations, and resonance. Apply wave mechanics to sound and ocean tides. Discuss the Doppler effect.

OUT-OF-CLASS ASSIGNMENTS:

Reading and problems from text.

9 lecture/9 lab Hours

CONTENT: Electricity and magnetism. Lab: Final Project.

SPO: Students will be able to discuss, compare and contrast Coulomb's Law and Newton's Law of Gravitation. Discuss the electric field, electric potential and work, electrical potential energy and conservation of energy with charged particles. Students will be able to identify, compare and contrast basic elements of electric circuits. Discuss Ohm's Law and electric power. Students will be able to discuss the origin of magnetism, the magnetic fields and its effect on the motion of charged particles, and the operation of electric motors. Discuss induced magnetic fields due to electric currents.

OUT-OF-CLASS ASSIGNMENTS: Problems and reading from text.

3 lecture/3 lab

Hours

CONTENT: Light and optics. Lab: Final Project

SPO: Students will be able to discuss electromagnetic waves and the electromagnetic spectrum. Discuss, compare and contrast refraction, reflection, interference, and diffraction. Discuss lenses, magnification and prisms.

OUT-OF-CLASS ASSIGNMENTS: Reading and problems from text.

3 lecture/3 lab Hours

Final project presentation and demonstration.

METHODS OF INSTRUCTION:

Lecture/discussion. Group projects. Laboratory exercises.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 108

Assignment Description:

1. Analyze and study pertinent text material, solved examples and lecture notes.
2. Apply principles and skills covered in class by solving regularly-assigned homework problems.
3. Regularly synthesize course materials in preparation for exams.
4. Projects to apply concepts learned in class

METHODS OF EVALUATION:

Percent of total grade: 20.00 %

Lab reports

Objective examinations

Percent of total grade: 60.00 %

Multiple choice; True/false; Completion; Essay

Other methods of evaluation

Percent of total grade: 20.00 %

Final project

REPRESENTATIVE TEXTBOOKS:

Paul G. Hewitt. Conceptual Physics, 12th Edition. Pearson,2014.

ISBN: 978-0321909107

Reading Level of Text, Grade: 12 Verified by: Jennifer Nari

Paul G. Hewitt, Dean Baird. Laboratory Manual: Activities, Experiments, Demonstrations & Tech Labs for Conceptual Physics. Pearson; 12 edition,2014.

ISBN: ISBN-13: 978-0321940056; ISBN-10: 0321940059

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

GAV B1, effective 201170

GAV B3, effective 201170

CSU GE:

CSU B1, effective 201170

CSU B3, effective 201170

IGETC:

IGETC 5A, effective 201170

IGETC 5C, effective 201170

CSU TRANSFER:

Transferable CSU, effective 201170

UC TRANSFER:

Transferable UC, effective 201170

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department: PHYS

CSU Crosswalk Course Number: 1

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: CCC000158363

Sports/Physical Education Course: N

Taxonomy of Program: 190200