# PHYS C120: ALGEBRA BASED PHYSICS: MECHANICS

| Item | Value |
|---|---|
| Top Code | 190200 - Physics, General |
| Units | 4 Total Units |
| Hours | 108 Total Hours (Lecture Hours 54; Lab Hours 54) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | No |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Open Entry/Open Exit | No |
| Grading Policy | Standard Letter (S) |
| Local General Education (GE) | • Area 5A Physical Sciences (CB1) |
| California General Education Transfer Curriculum (Cal-GETC) | • Cal-GETC 5A Physical Science (5A)<br>• Cal-GETC 5C Laboratory Activity (5C) |
| Intersegmental General Education Transfer Curriculum (IGETC) | • IGETC 5A Physical Science (5A)<br>• IGETC 5C Laboratory Activity (5C) |
| California State University General Education Breadth (CSU GE-Breadth) | • CSU B1 Physical Science (B1)<br>• CSU B3 Laboratory Activity (B3) |

## Course Description

The course covers Mechanics, Heat, and Sound. It satisfies the physics requirement of biological science programs (except University of California Programs) and technical programs, except physics, chemistry, or engineering. It satisfies requirements as liberal arts elective. PREREQUISITE: MATH C120 with a grade of C or better. ADVISORY: PHYS C110 or concurrent enrollment. Transfer Credit: CSU; UC: Credit Limitation: PHYS C120, PHYS C125 and PHYS C185, PHYS C280 combined: maximum credit, 1 series; No credit for PHYS C110, PHYS C110L or PHYS C140, CHEM C140 if taken after PHYS C120 or PHYS C185. C-ID: PHYS 105, PHYS 100 S.**C-ID:** PHYS 105, PHYS 100 S.

## Course Level Student Learning Outcome(s)

1. Demonstrate problem solving skills involving constant acceleration equations and Newton's Laws.
2. Demonstrate problem solving skills involving energy and energy transfer and momentum.
3. Demonstrate problem solving skills involving fluid mechanics and thermodynamics.
4. Demonstrate problem solving skills involving wave motion and sound.

## Course Objectives

- 1. Analyze and solve problems involving constant acceleration equations
- 2. Analyze and solve problems involving Newton's Laws.
- 3. Analyze and solve problems involving energy and energy transfer
- 4. Analyze and solve problems involving momentum.
- 5. Analyze and solve problems involving waves.
- 6. Analyze and solve problems involving fluid dynamics.
- 7. Analyze and solve problems involving thermodynamics.

## Lecture Content

MECHANICS: Units, Scalars and Vectors Motion in One and Two Dimensions Newton's Laws of Motion and Gravitation Statics and Dynamics. Momentum and Collisions Work and Energy Rotational Kinematics and Dynamics Fluid Statics and Dynamics HEAT and THERMODYNAMICS: Temperature and Thermal Expansion Laws of Thermodynamics Kinetic Theory Entropy VIBRATIONS, WAVES, and SOUND Vibrations and Waves Sound

## Lab Content

Collect data with appropriate sensors and significant figures. Analyze data in graphical form. Perform experiments involving positions, velocities, accelerations and forces. Perform experiments involving buoyancy and fluid mechanics. Perform experiments involving oscillators and simple harmonic motion.

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

## Instructional Techniques

A variety of instructional techniques will be employed to encompass different student learning styles. These may include, but are not limited to, lecture, discussion, and small group activities. Instruction will be supplemented, where appropriate, by PowerPoint presentations, videos, simulations, and other electronic resources and technologies.

## Reading Assignments

Students will complete reading assignments from the textbook as well as any supplemental reading based upon handouts, Internet resources, and assignments from the Coastline Library.

## Writing Assignments

Lab Reports, Quiz and Test questions, and Discussions will require the student to demonstrate and communicate a qualitative understanding of scientific concepts.

## Out-of-class Assignments

Outside of the classroom, students will do the required reading, study for quizzes and exams, and conduct research, where applicable, to prepare for discussions.

## Demonstration of Critical Thinking

Students will demonstrate critical thinking through written work such as lab reports as well as active participation in class discussions.

## Required Writing, Problem Solving, Skills Demonstration

Problem-Solving will be emphasized in the class through homework assignments, quiz and test questions, and testing predictions based on simulations and hands-on experiments. Writing skills will be demonstrated by essay questions and lab reports.

## Eligible Disciplines

Physics/Astronomy: Master's degree in physics, astronomy, or astrophysics OR bachelor's degree in physics or astronomy AND master's degree in engineering, mathematics, meteorology, or geophysics OR the equivalent. Master's degree required.

## Textbooks Resources

1. Required Knight, R.; Jones, B.; Field, S. College Physics, A Strategic Approach, 4th ed. Pearson, 2019 2. Required Urone, P.; Hinrichs, R. College Physics, 1st ed. OpenStax College, 2020 Rationale: -

## Other Resources

1. Coastline Library