



5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

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

TERM EFFECTIVE: Spring 2023 **CURRICULUM APPROVAL DATE:** 03/14/2023

SHORT TITLE: GENERAL PHYSICS I

LONG TITLE: General Physics I

<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
		Total Learning Hrs:	216	

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. **PREREQUISITE:** MATH 8A. High-school level reading and writing skills strongly recommended. (C-ID: PHYS 105), (C-ID: PHYS 100S: PHYS 2A + PHYS 2B)

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

047 - Laboratory - LEH 0.7

05 - Hybrid

71 - Dist. Ed Internet Simultaneous

72 - Dist. Ed Internet Delayed

73 - Dist. Ed Internet Delayed LAB

737 - Dist. Ed Internet LAB-LEH 0.7

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Describe vectors and their manipulation and use them as problem solving tools.
2. Identify, describe, compare and contrast distance, displacement, speed, velocity and acceleration.
3. Identify, describe, compare and contrast various forces, Newton's Laws, conservation of momentum, conservation of energy, power and work.
4. Identify, describe and contrast simple harmonic motion and rotational motion.
5. Identify, describe, compare and contrast longitudinal, transverse and sound waves.
6. Identify, describe, compare and contrast temperature, heat energy, heat transfer, and the first and second laws of thermodynamics.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Predict the future trajectory of an object in two dimensions with uniform acceleration.
2. Analyze a physical situation with multiple constant forces acting on a point mass using Newtonian mechanics.
3. Analyze a physical situation using concepts of work and energy.
4. Analyze static and dynamic extended systems using the concepts of torque and angular acceleration.
5. Analyze real-world experimental data, including appropriate use of units and significant figures.
6. Relate the results of experimental data to the physical concepts discussed in the lecture portion of the class.

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

Curriculum Approval Date: 03/14/2023

LECTURE CONTENT:

3 hours Lec

Content: Introduction, numbers and units, math review.

3 hours Lec

Content: One-dimensional kinematics.
6 hours Lec
Content: Vector analysis. Two dimensional kinematics.
6 hours Lec
Content: Forces. Newton's Laws.
3 hours Lec
Content: Uniform circular motion.
6 hours Lec
Content: Work, Energy and Conservation of Energy
3 hours Lec
Content: Linear Momentum, Collisions and Impulse.
3 hours Lec
Content: Rotational kinematics.
3 hours Lec
Content: Rotational dynamics.
3 hours Lec
Content: Spring forces and elasticity.
3 hours Lec
Content: Fluids Statics and Fluid Dynamics.
6 hours Lec
Content: Simple Harmonic Motion (Oscillations) and Waves
4 Hours Lec
Content: Thermal Physics and the Laws of Thermodynamics
2 hours
Final Exam

LAB CONTENT:

The Lab activities for the course will be divided as:

- (a) Experimental activities (50%)
- (b) Problem-Solving activities using educational simulations (50%)

6 HOURS

LAB: Math review and finding the resultant of vectors

3 HOURS

LAB: Free-fall determination of g.

3 HOURS

LAB: Moving Man: One Dimensional Kinematics

3 HOURS

LAB: Projectile motion.

3 HOURS

LAB: Acceleration of a system subjected to unbalanced forces.

3 HOURS

LAB: Frictional forces

3 HOURS

LAB: Centripetal acceleration and uniform circular motion.

3 HOURS

LAB: Conservation of energy using springs

3 HOURS

LAB: Conservation of energy using pendulum

3 HOURS

LAB: Conservation of momentum - collisions

3 HOURS

LAB: Angular acceleration of rotating objects.

3 HOURS

LAB: Equilibrium of a rigid bar subjected to torques.

3 HOURS

LAB: Conservation of momentum for multi-particle systems.

3 HOURS

LAB: Hooke's Law for springs and solids

3 HOURS

LAB: Gravity and Orbits

3 HOURS

LAB: Buoyancy and Torricelli's Tower.

3 HOURS

LAB: Longitudinal vs Transverse Waves

METHODS OF INSTRUCTION:

Lecture/discussion. Laboratory exercises. Group projects.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours 54

Assignment Description

Regularly assigned homework that requires students to analyze and study pertinent text material, solved examples and lecture notes.

Required Outside Hours 54

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

Evaluation Percent 20

Evaluation Description

Lab Reports.

Problem-solving assignments

Evaluation Percent 20

Evaluation Description

Homework, quizzes, projects.

Objective examinations

Evaluation Percent 60

Evaluation Description

In-class written exams.

REPRESENTATIVE TEXTBOOKS:

Urone, Hinrichs, Dirks and Sharma, OpenStax. College Physics. Wiley, 2022

ISBN: ISBN-10: 1-947172-01-8

Reading Level of Text, Grade: 12 Verified by: By: David Argudo

Lab Manual: Wilson, Jerry D.; Hernandez, Cecilia A.; Physics Laboratory Experiments (8th Edition), 2015

ISBN: 9781305360341

Rationale: This is the most current edition

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: 100S

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

