

Course Outline of Record

1. Course Code: PH-002A
2.
 - a. Long Course Title: College Physics I
 - b. Short Course Title: COLLEGE PHYSICS I
3.
 - a. Catalog Course Description:

This is an algebra and trigonometry-based physics course designed for majors not seeking a degree in the sciences or engineering. This course is the first semester of the Physics 2 sequence. Topics include mechanics, sound, fluids, thermodynamics, and wave motion. This course is offered in the Fall semester of even-numbered years.

Note: The physics 2 sequence satisfies the physics requirement for some pre-professional students.
 - b. Class Schedule Course Description:

This is an algebra and trigonometry-based physics course designed for majors not seeking a degree in the sciences or engineering.
 - c. Semester Cycle (if applicable): N/A
 - d. Name of Approved Program(s):
 - BIOLOGY Associate in Science for Transfer Degree (AS-T)
4. Total Units: 4.00 Total Semester Hrs: 108.00
 Lecture Units: 3 Semester Lecture Hrs: 54.00
 Lab Units: 1 Semester Lab Hrs: 54.00
 Class Size Maximum: 28 Allow Audit: No
 Repeatability No Repeats Allowed
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:

Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm I-A)

 Prerequisite: MATH 005
 Prerequisite: ENG 061
6. Textbooks, Required Reading or Software: *(List in APA or MLA format.)*
 - a. Young, H. & Geller, R. (2011). *College Physics* (9/e). San Francisco, CA Pearson Addison Wesley.
 College Level: Yes
 Flesch-Kincaid reading level: 12
 - b. Coletta, Vincent (2010). *Physics Fundamentals* (2/e). Lakeville Physics Curriculum and Instruction. ISBN: 0971313458
 College Level: Yes
 Flesch-Kincaid reading level: 12
7. Entrance Skills: *Before entering the course students must be able:*
 - a. Apply facts about plane geometric figures to deduce the surface area and volume of three dimensional geometric figures.
 - MATH 005 - Apply facts about plane geometric figures to deduce the surface area and volume of three dimensional geometric figures.
 - b. Demonstrate an understanding of the concept of a function by identifying and describing a function graphically, numerically and algebraically.
 - MATH 005 - Demonstrate an understanding of the concept of a function by identifying and describing a function graphically, numerically and algebraically.
 - c. Use and interpret function notation to find “inputs” and “outputs” from the graph, table and/or an equation describing a function
 - MATH 005 - Use and interpret function notation to find “inputs” and “outputs” from the graph, table and/or an

equation describing a function

d. From an equation, graph or table, calculate average rates of change by using a difference quotient or by using slopes of secant lines. Analyze average rates of change to determine the concavity of a graph.

- MATH 005 - From an equation, graph or table, calculate average rates of change by using a difference quotient or by using slopes of secant lines. Analyze average rates of change to determine the concavity of a graph.

e. Represent a word problem (especially a geometric problem) with a function.

- MATH 005 - Represent a word problem (especially a geometric problem) with a function.

f. Recognize classical and analytic definitions of the trigonometric functions.

- MATH 005 - Recognize classical and analytic definitions of the trigonometric functions.

g. Solve triangles using right triangle trigonometry, the law of sines and the law of cosines.

- MATH 005 - Solve triangles using right triangle trigonometry, the law of sines and the law of cosines.

h. Graph the 6 trigonometric functions and demonstrate the ability to change parameters and predict corresponding graphic behavior.

- MATH 005 - Graph the 6 trigonometric functions and demonstrate the ability to change parameters and predict corresponding graphic behavior.

i. Use trigonometric functions to model periodic behavior.

- MATH 005 - Use trigonometric functions to model periodic behavior.

j. Analyze independently and set up application problems, thus applying problem solving technique to new situations. Demonstrate the ability to anticipate and check their proposed solutions.

- MATH 005 - Analyze independently and set up application problems, thus applying problem solving technique to new situations. Demonstrate the ability to anticipate and check their proposed solutions.

k. Communicate effectively with the instructor and mathematical community using proper terminology verbally as well as proper written notation.

- MATH 005 - Communicate effectively with the instructor and mathematical community using proper terminology verbally as well as proper written notation.

l. Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases

- ENG 061 - Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.

m. Demonstrate the ability to think critically and express ideas using various patterns of development.

- ENG 061 - Demonstrate the ability to think critically and express ideas using various patterns of development.

n. Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text

- ENG 061 - Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

8. Course Content and Scope:

Lecture:

1. Units, Trig, Vectors
2. 1D Kinematics
3. 2D Kinematics
4. Forces and Newtons Laws
5. Statics and Dynamics
6. Gravitation
7. Circular Motion
8. Work and Energy
9. Momentum and Collisions

10. Rotational Kinematics
11. Torques and Angular Momentum
12. Elasticity and Simple Harmonic Motion
13. Temperature and Heat, Phase Changes, Thermal Expansion, Heat Transfer
14. Laws of Thermodynamics
15. Kinetic Theory and the Ideal Gas Law
16. Heat Engines and Entropy
17. Waves and Sound
18. Superposition and Interference
19. Fluids

Lab: (if the "Lab Hours" is greater than zero this is required)

1. Units, Trig, Vectors
2. 1D Kinematics
3. 2D Kinematics
4. Forces and Newtons Laws
5. Statics and Dynamics
6. Gravitation
7. Circular Motion
8. Work and Energy
9. Momentum and Collisions
10. Rotational Kinematics
11. Torques and Angular Momentum
12. Elasticity and Simple Harmonic Motion
13. Waves and Sound
14. Thermodynamics
15. Superposition and Interference
16. Fluids

9. Course Student Learning Outcomes:

1. Discuss the history of physics and its impact on human history.
2. Use multiple representations (words, graphs, drawings, equations) to describe the motion of objects.
3. Identify the various forces acting on an object and analyze the resulting motion of the object using the laws of mechanics and gravity and appropriate mathematical techniques.
4. Describe the physics of oscillatory motion and waves; demonstrate analysis, problem solving skills and techniques to analyze oscillatory and wave phenomena.
5. Using the scientific method of inquiry and appropriate experimental techniques in a laboratory setting, set up basic physics experiments, acquire, record, and analyze data, and draw conclusions from the data.
6. Apply equations and laws of Physics to determine the behavior of solids, liquids, and gases.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. State and explain the fundamental laws and concepts of physics in the areas of mechanics, fluids, thermodynamics, sound and wave motion.
- b. Demonstrate an awareness of how physics has shaped history and how it will shape the future.
- c. Demonstrate the ability to prepare and analyze laboratory experiments using scientific methods in the areas of mechanics, fluids, thermodynamics, sound and wave motion.
- d. Utilize good problem solving techniques in the areas of mechanics, fluids, thermodynamics, sound and wave motion.
- e. Solve the standard physics problems appropriate for this course in the areas of mechanics, fluids, thermodynamics, sound and wave motion.
- f. Use and explain the mathematical techniques and concepts used in this course in the areas of mechanics, fluids, thermodynamics, sound and wave motion.

- g. Apply these techniques on real world science and engineering problems in the areas of mechanics, fluids, thermodynamics, sound and wave motion.
- h. Demonstrate an understanding of basic vector analysis in the areas of mechanics, fluids, thermodynamics, sound and wave motion.

11. Methods of Instruction: (*Integration: Elements should validate parallel course outline elements*)

- a. Demonstration, Repetition/Practice
- b. Discussion
- c. Laboratory
- d. Lecture

12. Assignments: (*List samples of specific activities/assignments students are expected to complete both in and outside of class.*)

In Class Hours: 108.00

Outside Class Hours: 108.00

a. In-class Assignments

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b. Out-of-class Assignments

- 1. Reading (text, study guides)
- 2. Homework (problems involving analyzing physical systems, calculations, graphing, formula derivations; conceptual questions testing comprehension of material)
- 3. Submit completed weekly supervised laboratory assignments in thesis format.
- 4. Maintain a comprehensive laboratory notebook documenting all lab activities.

13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- Written homework
- Laboratory projects
- Computational/problem solving evaluations
- Mid-term and final evaluations

14. Methods of Evaluating: Additional Assessment Information:

- a. Several periodic examinations on subject material. These examinations will all be essay; practical parts and short answer.
- b. A comprehensive final on all course material.
- c. Laboratory examinations will be given where students individually demonstrate their hands-on understanding of course material.
- d. Laboratory notebooks will be examined for completeness and correctness.

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

A: Physical Science with Lab

CSU GE Area B: Physical and its Life Forms(mark all that apply)

B1 - Physical Science

B3 - Laboratory Sciences

PO-GE C1-Natural Sciences

Explain concepts and theories related to physical, chemical, and biological natural phenomena.

Draw a connection between natural sciences and their own lives.

Use college-level mathematical concepts and methods to understand, analyze, and explain issues in quantitative terms.

IO - Scientific Inquiry

Predict outcomes utilizing scientific inquiry: using evidence and assertions determine which conclusions logically follow from a body of quantitative and qualitative data.

Analyze quantitative and qualitative information to make decisions, judgments, and pose questions.

PH 002A-College Physics I

IO - Critical Thinking and Communication

Apply principles of logic to problem solve and reason with a fair and open mind.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
CSU	CSU San Bernardino	PHYS 121	Basic Concepts of Physics I	12-13

17. Special Materials and/or Equipment Required of Students:

18. Materials Fees: Required Material?

Material or Item	Cost Per Unit	Total Cost
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19. Provide Reasons for the Substantial Modifications or New Course:

Change of Prerequisite

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*
b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000124157
b. T.O.P. Code [CB03]: 190200.00 - Physics, General
c. Credit Status [CB04]: D - Credit - Degree Applicable
d. Course Transfer Status [CB05]: A = Transfer to UC, CSU
e. Basic Skills Status [CB08]: 2N = Not basic skills course
f. Vocational Status [CB09]: Not Occupational
g. Course Classification [CB11]: Y - Credit Course
h. Special Class Status [CB13]: N - Not Special
i. Course CAN Code [CB14]: *N/A*
j. Course Prior to College Level [CB21]: Y = Not Applicable
k. Course Noncredit Category [CB22]: Y - Not Applicable
l. Funding Agency Category [CB23]: Y = Not Applicable
m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): BIOLOGY

Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)

23. Enrollment - Estimate Enrollment

First Year: 0

Third Year: 0

24. Resources - Faculty - Discipline and Other Qualifications:

- a. Sufficient Faculty Resources: Yes
b. If No, list number of FTE needed to offer this course: *N/A*

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the

Course: Yes

28. Originator Carl Farmer

Origination Date 01/30/18
