

PH 001: INTRODUCTORY PHYSICS

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Originator

aelshafie

Justification / Rationale

Adding a hybrid modality.

Introductory Physics is a conceptual intro course to Physics. In the proposed hybrid mode, the lecture will be online and the lab will be face to face. This modification will benefit many students who are non-traditional and those who prefer online courses. It is a one-step going toward OEI. This will also aid the college in scheduling and utilizing room usage.

Effective Term

Spring 2020

Credit Status

Credit - Degree Applicable

Subject

PH - Physics

Course Number

001

Full Course Title

Introductory Physics

Short Title

INTRO PHYSICS

Discipline**Disciplines List**

Physics/ Astronomy

Modality

Face-to-Face

Hybrid

Catalog Description

This course is an introduction to the basic concepts, theories, and principles of physics. Topics include mechanics, properties of matter, heat, electricity and magnetism, waves, and modern physics. Note: This course is designed for students in general education who need to satisfy a laboratory requirement in the physical sciences, and for those in technical programs who need an introduction to physical concepts.

Schedule Description

This course is an introduction to the basic concepts, theories, and principles of physics. Topics include mechanics, properties of matter, heat, electricity and magnetism, waves, and modern physics. Prerequisite: MATH 054 Advisory: ENG 061 IGETC: 5A*, 5C*

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours

54

In-class Hours

108

Out-of-class Hours

108

Total Course Units

4

Total Semester Hours

216

Prerequisite Course(s)

MATH 054

Advisory: ENG 061

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Paul G. Hewitt

Title

Conceptual Physics (12th Edition)

Edition

12

Publisher

Pearson

Year

2014

College Level

Yes

Flesch-Kincaid Level

16.2

ISBN #

978-0133498493

Class Size Maximum

24

Entrance Skills

Understand the Real Number System, including the following subsets of the Reals: Integers, Rationals, and Irrationals.

Prerequisite Course Objectives

MATH 054-Identify, recognize and classify real numbers, as integers, rationals, or irrationals and locate their approximate positions on the real number line.

Entrance Skills

Understand the concepts of variables and how variables can be used to represent unknown quantities.

Prerequisite Course ObjectivesMATH 054-Understand the concepts of variables and how variables can be used to represent an unknown quantity or a range of quantities.

Entrance Skills

Use variables to create algebraic expressions that model an application problem

Prerequisite Course Objectives

MATH 054-Use variables to create algebraic expressions that model quantities in an application problem.

Entrance Skills

Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions - perform arithmetic operations with algebraic expressions using the order of operations.

Prerequisite Course Objectives

MATH 054-Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions involving polynomial, rational and radical expressions - perform arithmetic operations with algebraic expressions using the order of operations.

Entrance Skills

Understand and use the properties of integer exponents to simplify algebraic expressions, including expressions involving scientific notation.

Prerequisite Course Objectives

MATH 054-Use the properties of integer exponents to simplify algebraic expressions, including expressions involving scientific notation.

Entrance Skills

Understand the concept of an algebraic equation and the meaning of a solution to the equation.

Prerequisite Course Objectives

MATH 054-Analyze the concept of an algebraic equation and demonstrate the meaning of a solution to the equation, including integer, non-integer rational, decimal and radical solutions.

Entrance Skills

Use variables with the algebraic method to create algebraic equations or inequalities that model an application problem.

Prerequisite Course Objectives

MATH 054-Employ variables to create algebraic equations or inequalities that model an application problem.

Entrance Skills

Understand and use the addition, subtraction, multiplication, and division properties of equality to solve linear equations.

Prerequisite Course Objectives

MATH 054-Use properties of equality to solve linear equations in one variable and describe the solution using set notation.

Entrance Skills

Understand and use the addition, subtraction, multiplication, and division properties of inequality to solve linear inequalities and graph the solution on the number line.

Prerequisite Course Objectives

MATH 054-Use the properties of inequality to solve linear inequalities in one variable and describe the solution set in set notation and graphically.

Entrance Skills

Add, subtract, multiply and divide polynomials.

Prerequisite Course Objectives

MATH 054-Add, subtract, multiply and divide polynomials.

Entrance Skills

Factor out the greatest common divisor from a polynomial expression and factor quadratic binomials and trinomials over the rationals.

Prerequisite Course Objectives

MATH 054-Factor the greatest common divisor from a polynomial expression and factor quadratic binomials and trinomials with integer coefficients.

Entrance Skills

Apply the zero product principle to solve quadratic equations by factoring.

Prerequisite Course Objectives

MATH 054-Solve quadratic equations in one variable by factoring and applying the zero product property.

Entrance Skills

Add, subtract, multiply, divide and simplify rational expressions.

Prerequisite Course Objectives

MATH 054-Add, subtract, multiply, divide and simplify rational expressions.

Entrance Skills

Solve rational equations that simplify to linear equations.

Prerequisite Course Objectives

MATH 054-Solve rational equations that simplify to linear or quadratic equations.

Entrance Skills

Understand square roots and solve square root equations.

Prerequisite Course Objectives

MATH 054-Interpret square roots and solve square root equations.

Entrance Skills

Understand the Cartesian coordinate system and use it to graph linear equations by plotting points.

Prerequisite Course Objectives

MATH 054-Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

Entrance Skills

Understand the connection between the solution of an equation with two variables and the graph of that equation.

Prerequisite Course Objectives

MATH 054-Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

Entrance Skills

Understand the meaning of the slope of a line and find an equation for a line using general forms including point-slope and slope intercept.

Prerequisite Course Objectives

MATH 054-Convert between the geometric (Cartesian) and algebraic representations of a linear relation in two variables. Make use of point-slope and slope intercept forms.

MATH 054-Interpret the meaning of the slope of a line as a constant rate of change.

Entrance Skills

Apply learned principles and skills to new situations in addition to situations that mimic those on the homework and those shown in class.

Prerequisite Course Objectives

MATH 054-Apply learned principles and skills to novel situations in addition to situations that mimic those on the homework and those shown in class.

Entrance Skills

Application (word) problems that involve all of these skills and concepts

Prerequisite Course Objectives

MATH 054-Use variables to create algebraic expressions that model quantities in an application problem.
MATH 054-Employ variables to create algebraic equations or inequalities that model an application problem.

Entrance Skills

Square Roots and Pythagorean Theorem.

Prerequisite Course Objectives

MATH 054-Deduce right triangle side lengths using the Pythagorean Theorem and square roots.

Entrance Skills

Understand and use basic formulas from geometry including perimeter, area, and volume.

Prerequisite Course Objectives

MATH 054-Use basic formulas from geometry to find perimeter, area and volume of basic figures.

Entrance Skills

Apply units and unit conversion appropriately to solve application word problems that involve their use. Dimensional Analysis.

Prerequisite Course Objectives

MATH 054-Use dimensional analysis appropriately in applications.

Entrance Skills

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

Prerequisite Course Objectives

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

Entrance Skills

Recognize features of style such as purpose, audience and tone integrate these elements into academic and professional writing.

Prerequisite Course Objectives

ENG 061-Recognize features of style such as purpose, audience and tone integrate these elements into academic and professional writing.

Entrance Skills

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

Prerequisite Course Objectives

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.

Entrance Skills

Utilize a handbook to properly cite and document source material in MLA format.

Prerequisite Course Objectives

ENG 061-Utilize a handbook to properly cite and document source material in MLA format.

Course Content

1. Laws of Motion
2. Principles of Momentum and Energy Conservation
3. Rotational Motion
4. Fluids
5. Ideal Gases
6. Heat
7. Electric and Magnetic Forces and Phenomena
8. Oscillatory Motion and Waves
9. Relativity
10. Modern Physics

Lab Content

1. Metric system
2. Graphing data
3. Data analysis
4. Set up and perform basic physics experiments
5. Laws of Motion
6. Principles of Momentum and Energy Conservation
7. Rotational Motion
8. Fluids
9. Ideal Gases
10. Heat
11. Electric and Magnetic Forces and Phenomena
12. Oscillatory Motion and Waves

Course Objectives

	Objectives
Objective 1	Utilize good problem solving techniques on real world science and engineering problems.
Objective 2	Create and interpret motion graphs
Objective 3	Analyze experimental data using basic statistical methods and graphical techniques
Objective 4	Determine and use correct units for physical quantities
Objective 5	Apply the laws of classical mechanics to analyze and solve simple static and dynamic problems, including free fall, rotational motion, and collision problems
Objective 6	Describe the concepts, theories, and phenomena of ideal gases, fluid mechanics, and thermodynamics
Objective 7	Discuss the Principle of Relativity and describe some of its predictions
Objective 8	Describe and explain various wave and oscillatory phenomena
Objective 9	Discuss the basic history of physics

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Use algebra, words, graphs, and drawings to describe the motion of objects.
Outcome 2	Analyze simple motion problems using the laws of motion and gravity.
Outcome 3	Describe and analyze wave and oscillatory phenomena.
Outcome 4	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.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Demonstration, Repetition/Practice	In class demonstrations
Lecture	Lectures, assignments, and visual aids
Laboratory	a. Supervised laboratories which consist of "hands-on" work with students working in small teams. b. Hands-on computer assisted acquisition and analysis of experimental data. c. Hands on use of computer simulation programs to explore physical concepts and phenomena .

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Self-paced testing, Student preparation	Students are required to do homework out of class which have self paced questions	Out of Class Only
Tests/Quizzes/Examinations	Students are going to take multiple exams during the course as a method of evaluation	In Class Only
Group activity participation/observation	Students are grouped to perform an experiment, collect and analyze data.	In and Out of Class
Computational/problem-solving evaluations	Many times in class and out, students are going to compute and solve physical problems	In and Out of Class
Laboratory projects	Students are required to do laboratory projects during the semester which is hands on experience and application of their class learning	In Class Only
Reading reports	Students are advised to read each chapter before coming to lecture to be prepared for a pre-lecture quiz which covers the chapter reading	In and Out of Class

Assignments
Other In-class Assignments

1. Students develop critical thinking skills through class participation and discussion of course topics.
2. Note taking.
3. Complete in-class worksheets and assignment.
4. Weekly supervised laboratory assignments.
5. Completion of a project-laboratory.

Other Out-of-class Assignments

1. Reading assignments (text, study guides)
2. Problem based and written homework assignments.
3. Laboratory Reports

Grade Methods

Letter Grade Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

50

On-campus %

50

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

The lab component will be face to face while the lecture will be online. Students in the lab setup and interact with physics instruments in order to observe, analyze and interpret a physical phenomena. Students work in groups of 3 to 4 and each group needs to turn in lab report by the end of the lab.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

a. Metric system b. Graphing data c. Data analysis d. Set up and perform basic physics experiments e. Laws of Motion f. Principles of Momentum and Energy Conservation g. Rotational Motion h. Fluids i. Ideal Gases j. Heat k. Electric and Magnetic Forces and Phenomena l. Oscillatory Motion and Waves.

All lab activity will take place on campus with supervision of instructor.

How will you assess the online delivery of lab activities?

Lab activities will be face to face.

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

We are going to use Mastering Physics and Learning Catalytics which is bundled with Mastering Physics. Mastering Physics is part of Pearson publisher and they handle student data security.

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

With Mastering Physics, students will have access to the book in the form of an etext. Students will have a study area, where they can do the reading, visual, conceptual quizzes, and self-guided tutorials. This is in addition to the homework system and the vocabulary study tool.

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Timely feedback and return of student work as specified in the syllabus
Discussion forums with substantive instructor participation
Chat room/instant messaging
Regular virtual office hours
Online quizzes and examinations
Video or audio feedback
Weekly announcements

External to Course Management System:

Posted audio/video (including YouTube, 3cm mediasolutions, etc.)

For hybrid courses:

Scheduled Face-to-Face group or individual meetings
Orientation, study, and/or review sessions

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

One of my main goals is to maintain effective contact and engagement with students. I am planning to achieve this by addressing three main ways: A) Learner to Resources B) Learner to Learner C) Faculty to Learner

A) Learner to Resources: Students are required to read the chapter before taking a pre-chapter quiz. They will have access to lecture and video material to comprehend each chapter goals and outcome. When they are done with their learning resources, they will take the post-chapter quiz, do their homework and post their learning summary in a discussion forum.

B) Learner to Learner: At the beginning of the semester, students are going to introduce themselves and students are going to make groups based on majors or interests.

Students are going to submit their summarized learning for each chapter and view other students summary, comment on them in discussion forums.

Students are going to be interacting with each other on group project and study sessions.

C) Faculty to Learner: At the beginning of the semester, an orientation session will take place. In this session, a discussion of the syllabus will take place as well as communicating class expectations. Announcements will be used throughout the course. I am going to hold regular virtual office hours and virtual group office hours. I am going to post feedback on student and group work.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

Some of the videos will be posted on 3cm mediasolutions. I am planning to use zoom for virtual group discussions.

Online Course Enrollment

Maximum enrollment for online sections of this course

24

Other Information

Comparable Transfer Course Information

University System

CSU

Campus

CSU San Bernardino

Course Number

100

Course Title

Physics in the Modern World

Catalog Year

2014

University System

UC

Campus

UC Riverside

Course Number

PHYS 016

Course Title

Principles of Physics

Catalog Year

2013

COD GE

C1 - Natural Sciences

CSU GE

B1 - Physical Science

B3 - Laboratory Activity

IGETC GE

5A - Physical Science

5C - Science Laboratory

MIS Course Data

CIP Code

40.0801 - Physics, General.

TOP Code

190200 - Physics, General

SAM Code

E - Non-Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Transfer CSU, limited UC

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Approvals**Curriculum Committee Approval Date**

9/03/2019

Academic Senate Approval Date

9/12/2019

Board of Trustees Approval Date

10/31/2019

Course Control Number

CCC000332087

Programs referencing this coursePower Generation and Distribution (<http://catalog.collegeofthedesert.eduundefined?key=139/>)Liberal Arts: Math and Science AA Degree (<http://catalog.collegeofthedesert.eduundefined?key=29/>)Elementary Teacher Education AA-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=5/>)