

# PHYSICS

Physics is the scientific study of matter and energy and the interaction between the two. Courses in physics satisfy general education requirements for the associate degree, an associate degree for transfer in physics and lower division transfer.

## Faculty

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## Contact Information

### Division

Natural, Physical and Health Sciences

### Dean

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### Discipline Website

<https://www.citruscollege.edu/academics/programs/phys> (<https://www.citruscollege.edu/academics/programs/phys/>)

## Learning Outcomes

This discipline prepares students to do the following:

- Qualitatively and quantitatively predict, analyze or explain physical phenomena both verbally and in written form (including pictorial, graphical, and mathematical methods) using physics principles and models as appropriate for the course.
- Distinguish between scientific and non-scientific questions and methods and understand science as a process in order to think logically and coherently about technical/scientific issues, understand the complex problems involved in science and engineering and gain an appreciation for the global social and political impact of scientific endeavors. This includes critically analyzing scientific information found in print, visual, or online media such as scientific and non-scientific books, journals, articles, web pages, television, and film.
- By working together in lab, discussion and/or on projects and assignments, develop interpersonal skills and respect for others as well as an appreciation for the collaborative nature of scientific work.

## Courses

### PHYS 109

#### Physics and the Arts

**3 Units (AA/AS; Citrus B2; CSU; CSUGE B1)**

**54 lecture hours**

**Grade Mode: Standard Letter**

*Strongly recommended: MATH 160; ENGL 101.*

A one semester course for non-science majors covering fundamental physics principles and their application to the fine and performing arts as well as theater technology situations.

### PHYS 110

#### Physics in Everyday Life

**4 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**54 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Strongly recommended: Elementary algebra or higher or direct placement based on multiple measures; ENGL 101.*

A general physics course for non-majors that explores fundamental principles of the physical world, including kinematics, Newton's laws of motion, conservation laws, electromagnetism, waves, optics and modern physics. Special emphasis is given to the applicability of these principles to understand today's core science and technology issues and how everyday things work.

### PHYS 110H

#### Physics in Everyday Life - Honors

**4 Units (AA/AS; CSU)**

**54 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): Student must be eligible for the Citrus College Honors Program or obtain a recommendation from an Honors instructor.*

*Strongly recommended: NC 260A, or MATH 150 or higher, or direct placement based on multiple measures; ENGL 101.*

A physics course designed to equip non-majors with the knowledge to make wiser decisions for the self, family, organization, community, and planet. Energy, heat, gravity and space, conservation laws, electromagnetism, waves, and nuclear physics, are all explored in the context of their applicability to the core science and technology issues of our modern world. Students are expected to participate at an honors level. This includes leading discussions, giving and receiving detailed feedback to improve speaking and writing, formulating research questions, and developing their number sense through both estimation and precise calculations.

**PHYS 111****College Physics A**

**4 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**54 lecture hours, 54 lab hours**

**Equivalent to: PHYS 111H**

**Grade Mode: Standard Letter**

*Prerequisite(s): MATH 151 or higher.*

*Strongly recommended: ENGL 101.*

A trigonometry-based physics course including mechanics, energy, matter, properties of materials, wave motion, and thermodynamics. This course is designed for architecture and liberal arts students who require or are interested in a physics course beyond algebra-based physics. This course is the first in a two-course sequence for students planning to enter medicine, dentistry, pharmacy, optometry, forestry, and (4 year) nursing. (Life Science majors who need calculus-based physics must also take PHYS 111C.)

**PHYS 111H****College Physics A - Honors**

**4 Units (AA/AS; CSU)**

**54 lecture hours, 54 lab hours**

**Equivalent to: PHYS 111**

**Grade Mode: Standard Letter**

*Prerequisite(s): MATH 151 or higher.*

*Strongly recommended: ENGL 101.*

A trigonometry-based physics course including mechanics, energy, matter, properties of materials, wave motion, and thermodynamics. This course is designed for architecture and liberal arts students who require or are interested in a physics course beyond algebra-based physics. This course is the first in a two-course sequence for students planning to enter medicine, dentistry, pharmacy, optometry, forestry, and (4 year) nursing. (Life Science majors who need calculus-based physics must also take PHYS 111C.) Student must be eligible for the Citrus College Honors Program or obtain a recommendation from an Honors instructor. Students are expected to work and participate at an honors level, which includes designing experiments, and collaboration with and presentations to classmates on the connections between physics and Life Sciences.

**PHYS 112****College Physics B**

**4 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**54 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): PHYS 111.*

*Strongly recommended: ENGL 101.*

The second of two trigonometry-based physics courses covering optics, electromagnetism and modern physics with an emphasis on how these concepts apply to biological systems. This course is designed for students planning to enter medicine, dentistry, pharmacy, optometry, forestry, and (4 year) nursing. (For transfer as a calculus-based physics course, students must take PHYS 112C.)

**PHYS 201****Physics A: Mechanics**

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**72 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): MATH 190.*

Fundamental principles of mechanics, vectors, motion, work, energy, momentum, and rotational motion. Required for all majors in engineering, physics, chemistry, and some geology and mathematics majors.

**PHYS 201H****Physics A: Mechanics - Honors**

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1)**

**72 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): MATH 190; student must be eligible for the Citrus College Honors Program or obtain a recommendation from an Honors instructor.*

Students are expected to work and participate at an honors level which includes work related to fundamental principles of mechanics, vectors, motion, work, energy, momentum, and rotational motion. Required for all majors in engineering, physics, chemistry, and some geology and mathematics majors.

**PHYS 202****Physics B: Thermodynamics and Electromagnetism**

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**72 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): PHYS 201 or PHYS 201H; MATH 191.*

*Strongly recommended: MATH 210 as a pre- or co-requisite.*

Core topics include electrostatics, magnetism, DC and AC circuits, laws of thermodynamics, and the kinetic theory of gases. This course is part of a three-semester sequence and is required of all majors in engineering, physics, chemistry, and some geology and mathematics majors.

**PHYS 203****Physics C: Waves, Optics & Modern Physics**

**5 Units (AA/AS; Citrus B2; Citrus B3; CSU; UC; IGETC 5A; IGETC 5C; CSUGE B1; CSUGE B3)**

**72 lecture hours, 54 lab hours**

**Grade Mode: Standard Letter**

*Prerequisite(s): PHYS 201 or PHYS 201H; MATH 191, which may be taken concurrently.*

Core topics are waves, optics and modern physics. This course is intended for students majoring in physical sciences and engineering and is part of a three-semester course sequence.

**PHYS 210****Introduction to Computational Physics****1 Unit (AA/AS; CSU)****54 lab hours****Grade Mode: Standard Letter***Prerequisite(s): PHYS 201 or PHYS 201H.**Strongly recommended: MATH 210.*

This course introduces students to modern computational methods for modeling and visualization used in solving complex scientific problems. Common data manipulation and numerical analysis techniques will be introduced, with a focus on teaching students how to select tools to solve problems, rather than to teach all the details of specific tools. The skills gained in this course are highly valued in the broad scientific and industrial workplace. Students who successfully complete this course will be prepared for upper division coursework in physics and related fields and have useful skills for internships and other entry-level positions.

**PHYS 220A****Introduction to Independent Research in Physics****1 Unit (AA/AS; CSU)****54 lab hours****Grade Mode: Standard Letter***Prerequisite(s): Instructor approval is required prior to enrollment.**Strongly recommended: PHYS 110, PHYS 111 or PHYS 201; ENGL 101 or ENGL 101H.*

An introductory course in research for students interested in physics-related research or projects. This course includes an introduction to research methods, directed reading, or other advanced study beyond the introductory physics level.

**PHYS 225****Team-Based Research in Physics I****1 Unit (AA/AS; CSU)****54 lab hours****Grade Mode: Standard Letter***Prerequisite(s): PHYS 110 or PHYS 110H or PHYS 201 or PHYS 201H or concurrent enrollment for any.**Strongly recommended: ENGL 101.*

An introductory course in research for students participating in team based, physics-related research or projects. Topics include conducting a literature review, learning to be part of an effective research/design team and selecting feasible research ideas for implementation and outreach.

**PHYS 226****Team-Based Research Physics II****1 Unit (AA/AS; CSU)****54 lab hours****Grade Mode: Standard Letter***Prerequisite(s): PHYS 201 or PHYS 201H or PHYS 220A or PHYS 225; MATH 151 or MATH 190 or higher.**Strongly recommended: ENGL 101 or ENGL 101H or higher.*

A second course in research for students participating in team based, physics-related research or projects. Topics include preparing and presenting a professional-style research proposal and the development of an experimental design to carry out the research.

## Programs

**Associate Degree**

- ADT in Physics (<http://catalog.citruscollege.edu/disciplines/physics/physics-adt/>)