

Physics

Physics

Program Description

The focus of this program is on developing an understanding of and appreciation for the basic laws of our physical universe. This is done largely through the development of conceptual understanding, problem solving skills, and laboratory investigations.

Associate in Science Degree

The Associate in Science Degree can be obtained by completing a total of 60 units, including the 35 – 39-unit major listed below, the general education requirements, and electives. All courses for this major must be completed with a grade of C or better or a P if the course is taken on a Pass/No Pass basis.

Program Outcomes

Students who complete the Physics Associate Degree will be able to:

1. Demonstrate analytical and problem solving skills.
2. Carry out experiments and critically assess their data.
3. Learn the roles of hypotheses, measurement and analysis in the development of scientific theory as evidenced by laboratory reports.
4. Write a laboratory report or give an oral presentation.

REQUIRED COURSES Units

PHYS 006 Physics for Science and Engineering	5
PHYS 007 Physics for Science and Engineering	5
PHYS 008 Physics for Science and Engineering	5
MATH 020 Analytic Geometry and Calculus I	5
MATH 021 Analytic Geometry and Calculus II	5
MATH 023 Differential Equations	4
One course from Biological Science	3-5
One course from Physical Science	3-5
Total Units	35-39

Biological Science (select one course) Units

BIO 002 Principles of Cell and Molecular Biology	5
BIO 003 Evolution, Ecology & Biodiversity	5
BIO 005 Human Physiology	5
BIO 012 Environmental Science	3
BIO 014 Principles of Microbiology	4
BIO 015 Introduction to Biology	4
BIO 016 Introduction to Human Biology	3
BIO 018 Biology of Sex	3

Physical Science (select one course) Units

ASTR 010 General Astronomy	3
ASTR 020 Astronomy Laboratory	1
ASTR 030 The Solar System	3
ASTR 040 Stars, Galaxies, and Cosmology	3
CHEM 001 General Chemistry	5
CHEM 002 General Chemistry	5
CHEM 003 Organic Chemistry I	5
CHEM 004 Organic Chemistry II	5
CHEM 010 Intermediate Chemistry	4
CHEM 011 Basic Organic Chemistry and Biochemistry	4
GEOG 001 Physical Geography	3
GEOG 001L Physical Geography Laboratory	1
GEOL 001 Physical Geology	3
GEOL 002 Geology Laboratory	1
GEOL 005 Geology of California	3
PHSC 012 Introduction to the Principles of Physical Science	4

Physics

Associate in Science in Physics for Transfer (ADT: A.S.-T)

Program Description

The focus of this program is on developing an understanding of and appreciation for the basic laws of our physical universe. This is done largely through the development of conceptual understanding, problem-solving skills, and laboratory investigations. The Physics 006,007,008 sequence is a three-semester offering in introductory physics requiring math through calculus. This sequence satisfies the lower division physics requirement for majors in physics, chemistry, geology or other physical sciences, and engineering. Physics 006 is a study of mechanics, gravitation, vibration and fluids. In Physics 007, students will cover the topics of electricity, magnetism, wave motion, and sound. In Physics 008, students will cover heat, optics, relativity, and modern physics. Students will learn to analyze and solve problems appropriate for this level. Experiments relating to the topics covered will be performed.

Associate in Science in Physics for Transfer

The Associate in Science in Physics for Transfer, which aligns with the physics TMC, will prepare students for a baccalaureate degree in physics. It consists of the courses necessary for beginning physics students to be able to succeed in the upper division physics courses that they will encounter in the CSU system, or any institution (such as the UC system) that grants an undergraduate physics degree.

To earn the Associate in Science in Physics for Transfer degree, students must:

1. Complete 60 semester units that are eligible for transfer to the California State University, including both of the following:
 - a. The Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education – Breadth Requirements.
 - b. A minimum of 18 semester units or 27 quarter units in a major or area of emphasis, as determined by the community college district.
2. Obtain a minimum grade point average of 2.0.

Program Outcomes

Students who complete the Associate in Science in Physics for Transfer degree will be able to:

1. Demonstrate analytical and problem-solving skills.
2. Carry out experiments and critically assess their data
3. Learn the roles of hypotheses, measurement, and analysis in the development of scientific theory as evidenced by laboratory reports.
4. Write a laboratory report or give an oral presentation.

REQUIRED COURSES Units

PHYS 006 Physics for Science and Engineering	5
PHYS 007 Physics for Science and Engineering	5
PHYS 008 Physics for Science and Engineering	5
MATH 020 Analytic Geometry and Calculus I.....	5
MATH 021 Analytic Geometry and Calculus II.....	5
MATH 022 Analytic Geometry and Calculus III	4

Required Major Total Units 29

CSU General Education or IGETC Pattern Units 37 - 39

CSU Transferable Electives (as needed to reach 60 transferable units)*

Total Degree Units 60

** 7 units may be double counted toward both the major area of emphasis and CSU General Education or IGETC Pattern. Consult with a counselor for more information on completing this degree.*

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PHYS 002 **5.0 Units**
General Physics (Non-Calculus)

Prerequisite: A minimum grade of C in either MATH 051 or MATH 004. *Course Advisory:* Eligibility for ENGL 001. PHYS 002 & 004, a two-semester sequence in introductory physics using math through trigonometry, is recommended for teachers, technicians, pre-dentistry, pre-medical, and biology majors, and others who need a general physics course. It covers the study of motion, energy, momentum, gravitation, solids, fluids, thermodynamics and the gaseous state, vibration, wave motion, and sound. Experiments relating to the topics covered will be performed and students will analyze the experiments. *Field trip may be required.* C-ID PHYS 105. *Four hours lecture, three hours lab.*

PHYS 004 **5.0 Units**
General Physics (Non-Calculus)

Prerequisite: PHYS 002 with a minimum grade of C. *Course Advisory:* Eligibility for ENGL 001. PHYS 002 & 004, a two-semester sequence in introductory physics using math through trigonometry, is recommended for teachers, technicians, pre-dentistry, pre-medical, and biology majors, and others who need a general physics course. It is a study of electricity, magnetism, light and optics, and modern physics. Students learn to analyze and solve problems appropriate for this level in these topics. Experiments relating to the topics covered will be performed and students will analyze the experiments. *Field trip may be required.* C-ID PHYS 110. *Four hours lecture, three hours lab.*

PHYS 006 **5.0 Units**
Physics for Science and Engineering

Prerequisite: MATH 021 with a minimum grade of C (may be taken concurrently). *Course Advisory:* Eligibility for ENGL 001 and High School Physics, or PHYS 002 with a minimum grade of C. The Physics 006, 007, 008 sequence is a three-semester offering in introductory physics requiring math through calculus. This sequence satisfies the lower division physics requirement for majors in physics, chemistry, geology or other physical sciences, and engineering. This course is a study of mechanics, gravitation, vibration and fluids. Students will learn to analyze and solve problems appropriate for this level in these topics. Experiments relating to the topics covered will be performed. C-ID PHYS 205. *Four hours lecture, three hours lab.*

PHYS 007 **5.0 Units**
Physics for Science and Engineering

Prerequisite: A minimum grade of C in both PHYS 006 and MATH 021. *Course Advisory:* Eligibility for ENGL 001. The PHYS 006, 007, 008 sequence is a three-semester offering in introductory physics requiring math through calculus. This sequence satisfies the lower division physics requirement for majors in physics, chemistry, geology or other physical sciences, and engineering. This course is a continuation of PHYS 006, covering the topics of electricity, magnetism, wave motion, and sound. Students will learn to analyze and solve problems appropriate for this level in these topics. Experiments relating to the topics covered will be performed. C-ID PHYS 210. *Four hours lecture, three hours lab.*

PHYS 008 **5.0 Units**
Physics for Science and Engineering

Prerequisite: A minimum grade of C in both PHYS 006 and MATH 021. *Course Advisory:* Eligibility for ENGL 001. The Physics 006, 007, 008 sequence is a three-semester offering in introductory physics requiring math through calculus. This sequence satisfies the lower division physics requirement for majors in physics, chemistry, geology or other physical sciences, and engineering. A continuation of PHYS 006 and PHYS 007, covering heat, optics, relativity, and modern physics. Students will learn to analyze and solve problems appropriate for this level in these topics. Experiments relating to the topics covered will be performed and students will analyze the experiments. *Field trip may be required.* C-ID PHYS 215. *Four hours lecture, three hours lab.*

PHYS 010 **3.0 Units**
Descriptive Physics

Course Advisory: SCC minimum English standard; MATH 330 or MATH 330B. An introductory physics course for both the non-science and the beginning science student. Includes topics such as nuclear physics, relativity, mechanics, properties of matter, quantum physics, heat, light, electricity and magnetism, sound and waves. Written assignments, tests, and a comprehensive final exam will be used to evaluate student success. *Field trip may be required.* *Three hours lecture.*