Definition

Physical sciences are those disciplines of the natural sciences other than the biological sciences. They generally involve nonliving materials and the principles of fundamental nature which have been sought since man appeared on earth. The laws of physics, for instance, are the very fundamental relationships which have existed since the universe was born. Some are complex, some are not. Some are simple yet others elude the best minds and grandest equipment yet devised by man. These laws, we are confident, guide in a very fundamental way, the human and animal world that we see around us. In a sense then, the physical sciences are the study of these same fundamental laws of nature as applied in very complex ways to living organisms.

Staff

To access faculty and staff, dial (661) 722-6300, then the 4-digit extension.

Dean:	
Vacant	ext. 6415
Administrative Assistant:	
Wendy Cios	ext. 6415
Clerical Assistant III:	
Suzanne Olson	ext. 6415
Department Chair:	
Dr. Alexandra Schroer	ext. 6922
Lab Technician:	
David Bermea	ext. 6274
Jon Paul Bauitista	ext. 6705
STEM:	
Christos Valiotis, Director	ext. 6024
Jamie Jones, Coordinator	ext. 6992
Christopher Bellingham, Lab Technician	ext. 6704
Faculty:	
Dr. Jason Bowen	ext. 6963
Dr. Mark McGovern	ext. 6006
Dr. Alexandra Schroer	ext. 6922
Paul Stahmann	ext. 6731
Christos Valiotis	ext. 6422
Adjunct Faculty:	

To access adjunct faculty voice mail, dial (661) 722-6300, then the 4-digit number.

	V.M.
William Rogers	2401
Dr. Kenneth Underwood	2726

Program Description

Physical sciences offered include: astronomy, physical science, and physics. The courses, for the most part, are designed to meet the general education and major transfer requirements for the physical sciences.

Students must receive a minimum grade of "C" or better in all required core courses and the specific courses listed as program electives in order to qualify for the degree or certificate.

Distinctive Features

Traditional teaching may be supplemented with computer and Internet-based instruction. Laboratory activities provide "hands-on" experimentation and discovery into the natural, physical and chemical characteristics of the earth and our universe. Engineering and life science applications may be presented and computer-based data acquisition and analysis may assist in some lab instruction.

Career Options

Astronomer
Astrophysicist
Geophysicist
Medical Physics
Physicist
Teacher
(These careers require education beyond the two-year college level.)

Program Learning Outcomes

Associate in Science in Physical Science

Students earning an Associate Degree in Physical Science will be able to:

1. Follow the scientific method to safely collect, evaluate, and analyze scientific data from an investigation of a physical phenomenon, then, prepare a report of findings from the investigation.
2. Apply mathematical and appropriate conceptual knowledge to solve problems in a variety of real life applications of physical phenomena.
3. Explain the fundamental aspects of the conservation laws (mass, energy, charge) and use these concepts to explain everyday phenomena.
4. Understand the structure of the atom and how it affects processes both in the macroscopic and microscopic.

Associate in Science in Physics for Transfer

1. Students will demonstrate an understanding of the fundamental principles and concepts of physics that include mechanics, electromagnetism, thermodynamics, modern physics, and quantum mechanics.
2. Students will competently apply this knowledge and analyze physical systems by constructing mathematical models in which they identify the essential aspects of a problem, formulate a strategy for solution, make appropriate approximations, evaluate the correctness of their solution, and communicate their work clearly.
3. Students will use basic computational techniques for modeling physical systems including those that don't have analytical answers.
4. Students will explore physical systems by setting up experiments, collecting and analyzing data, identifying sources of uncertainty, and interpreting their results in terms of the fundamental principles and concepts of physics.

5. Students will communicate physics concepts, processes, and results effectively, both verbally and in writing.

Certificate Program

Certificate not applicable.

Associate Degree

Associate in Science in Physics for Transfer

The Associate in Science in Physics for Transfer (AS-T in Physics) degree offers students a fundamental knowledge of Physics and its relation to science, technology, and engineering. Students will enhance their problem solving and critical thinking skills by applying mathematical models to real world problems or utilizing mathematical objects and theorems to evaluate the validity of a statement or to prove mathematical statements.

The Associate in Science in Physics for Transfer (AS-T in Physics) degree meets the requirements of SB 1440 for Associate Degrees for Transfer (ADT). These degrees are intended to make it easier for students to transfer to California State University campuses, but do not exclude admittance to other colleges or universities.

To earn an Associate in Science in Physics for Transfer (AS-T in Physics) degree a student must complete the following:

(1) Completion of 60 semester units or 90 quarter 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) Obtainment of a minimum grade point average of 2.0.

ADTs also require that students must earn a C or better in all courses required for the major or area of emphasis.

Required Courses	**units**
*PHYS 110, General Physics	4
PHYS 120, General Physics	4
PHYS 211, General Physics	5
*MATH 150, Calculus and Analytic Geometry	5
MATH 160, Calculus and Analytic Geometry	4
MATH 250, Calculus and Analytic Geometry	4

*Courses denoted with an asterisk will fulfill the completion requirements for both the major and general education.

Except in cases of prerequisite requirement, it is not required that courses be taken in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester	**units**
MATH 150, Calculus and Analytic Geometry (CSU GE B4)	5
CSU GE Course requirement Area A2	3
CSU GE Course requirement Area C2	3
CSU GE Course requirement Area D	3
	Total 14

Second Semester	**units**
MATH 160, Calculus and Analytic Geometry	4
PHYS 110, General Physics (CSU GE B1/B3)	4
CSU GE Course requirement Area A1	3
CSU GE Course requirement Area D	3
	Total 14

Third Semester	**units**
MATH 250, Calculus and Analytic Geometry	4
PHYS 120, General Physics	4
CSU GE Course requirement Area A3	3
CSU GE Course requirement Area D	3
	Total 14

Fourth Semester	**units**
PHYS 211, General Physics	5
CSU GE Course requirement Area C	3
CSU GE Course requirement Area C1	3
CSU GE Course requirement Area B2	3-4
	Total 14-15

CSU GE or IGETC Pattern 55-58
CSU Transferable Elective Units to reach Degree Total 60

Transfer

Students planning to continue studies at a four-year college or university after AVC should visit the Transfer Resource Center and consult with a counselor as soon as possible. Additional information on official transfer articulation agreements from AVC to many CSU/UC campuses can be found at the following Web site: *www.assist.org*

Prerequisite Completion

If a course is listed as a prerequisite for another course, that prerequisite course must be completed with a satisfactory grade in order to enroll in the next course. According to Title 5, Section 55200(d), a satisfactory grade is a grade of "A," "B," "C" or "P". Classes in which the Pass/No Pass option is available are indicated with an asterisk **(*)** before the course title. See "Pass/No Pass Option" in the catalog for full explanation.

Physical Science Course

PSCI 101 *PHYSICAL SCIENCE

4 units
6 hours weekly
(3 hours lecture, 3 hours lab)
Advisory: *Completion of ENGL 101/ENGL 101SL and MATH 102.*
Designed to meet lower division physical science requirements for the non-science major. Introduces basic concepts in physics and chemistry (motion, energy, atoms and chemical reactions) emphasizing concepts with a minimum of math. Especially recommended for students interested in teaching, library science, and humanities. (CSU, UC, AVC)

Physics Courses

PHYS 101 INTRODUCTORY PHYSICS

4 units
6 hours weekly
(3 hours lecture, 3 hours lab)
Advisory: *Completion of MATH 135 or MATH 140, and Eligibility for College Level Reading and ENGL 101/ENGL 101SL.*
This course is the first part of a two-semester algebra-trig introductory physics course. Topics covered are: kinematics, Newton's laws, statics, linear momentum, linear-rotational analogs, rotational dynamics, energy and its transformation, gravitation, fluids, heat and thermodynamics. (C-ID: PHYS 105) (CSU, UC, AVC)

PHYS 102 INTRODUCTORY PHYSICS

4 units
6 hours weekly
(3 hours lecture, 3 hours lab)
Prerequisite: *Completion of PHYS 101.*
This course is the second part of a two-semester algebra-trig introductory physics course. Topics covered are: mechanical waves, sound, electrostatics, current and DC circuits, magnetism, light and optics and modern physics. (C-ID: PHYS 110) (CSU, UC, AVC)

PHYS 110 GENERAL PHYSICS

4 units
6 hours weekly
(3 hours lecture, 3 hours lab)
Prerequisite: *Completion of or concurrent enrollment in MATH 150.*
Advisory: *Completion of ENGL 101/ENGL 101SL and PSCI 101.*
This course is the first part of a three-semester calculus-based introductory physics course for scientists and engineers. Topics covered are: kinematics, Newton's laws, statics, linear momentum, linear-rotational analogs, rotational dynamics, energy and its transformation, fluids, gravitation and oscillations. (C-ID: PHYS 205) (CSU, UC, AVC)

PHYS 120 GENERAL PHYSICS

4 units
6 hours weekly
(3 hours lecture, 3 hours lab)
Prerequisite: *Completion of PHYS 110, and Completion of or concurrent enrollment in MATH 160.*
Advisory: *Eligibility for College Level Reading and ENGL 101/ ENGL 101SL.*
This course is the second part of a three-semester calculus based introductory physics course for scientists and engineers. Topics covered are: electrostatics, electric fields and potentials, capacitance, resistance and current, DC circuits, magnetic fields, magnetic induction, Maxwell's Laws and AC circuits. (C-ID: PHYS 210) (CSU, UC, AVC)

PHYS 211 GENERAL PHYSICS

5 units
7 hours weekly
(4 hours lecture, 3 hours lab)
Prerequisite: *Completion of PHYS 110, and Completion of or concurrent enrollment in MATH 160.*
Advisory: *Completion of MATH 220.*
This course covers geometric optics, lenses, mirrors, optical instruments, wave optics/physical optics and laws of thermodynamics. In addition to these areas, the course contains selected topics from modern physics. These include special relativity, quantum mechanics, atomic physics, condensed matter/solid state physics, nuclear physics and particle physics. (C-ID: PHYS 215) (CSU, UC, AVC)