PHYSICAL SCIENCE

School of Physical Sciences and Technologies

Dean: Dr. Susan M. Cooper
Academic Chair: Kiana Tabibzadeh
Faculty: Roy McCord, Larry Oldewurtel, Dr. Joseph Oliva, Dr. Jennifer Tan

CURRICULUM

The curriculum in physical science includes courses in astronomy and physics. The curriculum is designed to attract and cultivate the student's imagination as to the origin, composition, and mechanics of the solar system; the movement of objects in relation with gravitational, magnetic, and electrical forces; the interaction between matter and energy; the behavior of light; and the physical characteristics of substances.

Courses offered through the curriculum meet general education requirements in natural sciences. They also may be taken as electives toward a major in liberal arts and sciences, or they may be taken to meet the requirements for an Associate in Arts degree with a major in physical science.

MAJOR

While a baccalaureate degree is recommended preparation for those considering professional careers related to physical science, the completion of the associate degree program will demonstrate commitment to the field and will provide comprehensive preparation for upper division work.

The purpose of this degree is to provide a solid background in the areas of physical science. By choosing the appropriate courses from the recommended electives list, students should be able to continue their education in chemistry, physics, engineering and many other fields in the physical sciences which require these courses as prerequisites.

ASSOCIATE DEGREE

- **Associate in Arts Degree in Physical Science**

Students must complete a minimum of 60 units of credit, including the courses in the major ("Major Requirements") and general education requirements (pages 65-73), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 61–64 for further information.

TRANSFER PREPARATION

Courses that fulfill major requirements for an associate degree at Irvine Valley College may not be the same as those required for completing the major at a transfer institution offering a baccalaureate degree. Students who plan to transfer to a four-year college or university should (1) refer to the University Studies major (page 224) and "Transfer Planning" (page 76); (2) consult the catalog of their prospective transfer institution (see the IVC Transfer Center for assistance); and (3) schedule an appointment with an IVC counselor to develop a plan of study before beginning their program. It may be helpful to meet with the department faculty at IVC.

MAJOR REQUIREMENTS: PHYSICAL SCIENCE
Associate in Arts Degree

Complete the following courses:		Units
CHEM 1A	General Chemistry I	5
CHEM 1B	General Chemistry II	5
MATH 3A	Analytic Geometry and Calculus I	5
MATH 3B	Analytic Geometry and Calculus II	5
PHYS 4A	General Physics	4
PHYS 4B	General Physics	4
	TOTAL UNITS:	**28**

Recommended Electives:
CS 30, MATH 4B, MATH 24, MATH 26.

"There is enormous growth in the use of photonics, electromagnetic energy in optics, laser technology, electrical engineering, materials science, information storage and processing in the sciences today. Students can develop aptitudes for a wide range of technology-driven careers by taking science and math classes that complement their majors."

— Roy McCord
Professor, Physical Science

ASTRONOMY COURSES

ASTR 20: GENERAL ASTRONOMY
3 Units
3 hours lecture
Transfers: CSU, UC
This introductory course traces the development of astronomy from ancient times to the present. The course examines the solar system, including the moon, sun, and planets; the evolution and composition of stars; the composition and evolution of galaxies; and cosmology. Field trips may be required. NR

ASTR 25: OBSERVATIONAL ASTRONOMY
3 Units
2 hours lecture, 3 hours lab
Transfers: CSU, UC
This laboratory course is designed primarily to provide students with a working knowledge of astronomical instruments and techniques. Students will use school-owned telescopes and other instrumentation to observe and study the moon, planets, stars, binary and multiple stars, star clusters, nebulae, and galaxies. Field trips may be required to fulfill the objectives of this course. NR

PHYSICS COURSES

PHYS 2A: INTRODUCTION TO PHYSICS
4 Units
3 hours lecture, 3 hours lab
Transfers: CSU, UC credit provisions (see UC course list)
Prerequisite: Prior completion of or concurrent enrollment in Math 124
This course is intended for students in the sciences and related subjects who are required to complete a physics course based on precalculus mathematics. The major emphasis is on mechanics with selected additions from vibrations and waves, fluids and thermodynamics. Topics include kinematics and dynamics in one and two dimensions; vectors; Newton's laws; conservation of energy and momentum; kinematics and dynamics of rotational motion; Hooke's Law; simple harmonic motions; wave interference and standing waves; gas laws; and the laws of thermodynamics. (CAN PHYS 2; Phys. 2A+2B: CAN PHYS SEQ A) NR

PHYS 2B: INTRODUCTION TO PHYSICS
4 Units
3 hours lecture, 3 hours lab
Transfers: CSU, UC credit provisions (see UC course list)
Prerequisite: Phys. 2A
This course is a continuation of Physics 2A. The course involves selected topics from electricity and magnetism, light, and atomic and nuclear physics. Areas of study include electrostatics, circuits, magnetism, electromagnetic induction, electromagnetic waves, ray optics, interference and diffraction, special relativity and atomic physics. (CAN PHYS 4; Phys. 2A+2B: CAN PHYS SEQ A) NR

PHYS 4A: GENERAL PHYSICS
4 Units
3 hours lecture, 3 hours lab
Transfers: CSU, UC credit provisions (see UC course list)
Prerequisite: Math 3A and prior completion of or concurrent enrollment in Math 3B
Recommended Preparation: Phys. 20
This is a calculus-based introduction to classical mechanics. Space and time; kinematics in one, two and three dimensions; forces and equilibrium; Newton's laws; particle dynamics; universal gravitation; conservation laws; work and potential energy; collisions; kinematics and dynamics of rigid bodies; oscillations and waves are studied. (CAN PHYS 8; Phys. 4A+4B+4C: CAN PHYS SEQ B) NR

PHYS 4B: GENERAL PHYSICS
4 Units
3 hours lecture, 3 hours lab
Transfers: CSU, UC credit provisions (see UC course list)
Prerequisite: Phys. 4A
Physics 4B is a calculus-based introduction to classical electromagnetism. Electrostatic force, electrostatics, current and magnetic force, magnetic fields, electromagnetic induction, and Maxwell's equations and electromagnetic waves are the major topics of study. (CAN PHYS 12; Phys. 4A+4B+4C: CAN PHYS SEQ B) NR

PHYS 4C: GENERAL PHYSICS
4 Units
3 hours lecture, 3 hours lab
Transfers: CSU, UC credit provisions (see UC course list)
Prerequisite: Phys. 4B
This is a calculus-based introduction to thermodynamics, light, and modern physics. Included are the kinetic theory of gases, laws of thermodynamics, thermal processes, properties of light, optical images, interference and diffraction, electromagnetic waves, relativity, and concepts in atomic and nuclear physics. (CAN PHYS 14; Phys. 4A+4B+4C: CAN PHYS SEQ B) NR

PHYS 20: THE IDEAS AND EVENTS OF PHYSICS
4 Units
3 hours lecture, 3 hours lab
Transfers: CSU, UC credit provisions (see UC course list)
This course is intended for students who are not majoring in science and have no previous physics training or mathematical background. It will focus on major discoveries, ideas, and methods in physics. Included are simple motions, the nature of matter and energy, and electrical and nuclear science. This course is designed to prepare students for more advanced physics courses. NR