SCIENCE

The Science Department offers courses of study designed to familiarize students with current methods, concepts, and achievements in science. Science is presented as a dynamic process of inquiry, hypothesis, problem-solving, and critical analysis. In presenting its curriculum, Jesuit's Science Department seeks to achieve the following goals: 1) To develop the students' ability to reason analytically and quantitatively; 2) To involve students in the scientific mode of inquiry: a cycle of reflection, hypothesis, prediction, trial and evaluation; 3) to acquaint students with the fascinating study of the physical and biological world; 4) to promote and assist students' discovery and pursuit of individual scientific interests. Students must take three years of science. All students must take Physics or Honors Physics followed by Chemistry or Honors Chemistry concluding with Biology or Honors Biology I. Qualifying freshmen may take Honors Physics. Students may also qualify to take Advanced Placement Physics, Advanced Placement Chemistry, Advanced Placement Biology II, or Advanced Placement Environmental Science as senior-year electives.

SCIENCE - HONORS AND ADVANCED PLACEMENT

The student in an Honors or Advanced Placement Science class is expected to do a greater amount of work than is normally done in that year of Science studies. The assumption is that a student who selects, with the approval of the instructors, an advanced section is willing both to approach the subject at a more sophisticated level and to devote additional time to study at home. Science Honors students must work independently. See "Requirements of Students Taking Honors and Advanced Placement Classes."

PHYSICS

2 SEMESTERS; OPEN TO SOPHOMORES

Physics is the study of the fundamental laws of nature and the search to understand the interactions between matter and energy. This course will examine concepts of mechanics, properties of matter, heat, waves (including sound and light) and electricity and magnetism through the use of demonstrations, computer simulations, laboratory activities and lectures. Although physics is not a rigorously mathematical course, students are expected to have a working knowledge of the fundamental principles of algebra.

PHYSICS – HONORS

2 SEMESTERS; OPEN TO SOPHOMORES AND QUALIFIED FRESHMEN

PREREQUISITE: ALGEBRA I; CURRENT ENROLLMENT IN GEOMETRY HONORS OR HIGHER; RECOMMENDATION OF MATH INSTRUCTOR AND ACADEMIC VICE PRINCIPAL

Physics is the study of the fundamental laws of nature and the search to understand the interactions between matter and energy. This course will examine concepts of mechanics, properties of matter, heat, waves (including sound and light) and electricity and magnetism through the use of demonstrations, computer simulations, laboratory activities and lectures. Honors Physics is taught with a greater emphasis on the use of mathematics in describing the laws of nature; therefore students are expected to have a firm understanding of the applied principles of algebraic manipulation, to have familiarity with trigonometry and to be highly motivated learners. Students seeking further clarification of prerequisite knowledge should consult a physics instructor.

GENERAL CHEMISTRY

2 SEMESTERS; OPEN TO SOPHOMORES, JUNIORS AND SENIORS

PREREQUISITE: PHYSICS OR PHYSICS HONORS & RECOMMENDATION FROM PHYSICS INSTRUCTOR.

This course provides a fundamental foundation in the study of matter and the changes matter undergoes. Students will investigate the different classes of chemical reactions, atomic theory, chemical bonding, the driving forces behind chemical reactions, properties of gases and an introduction to organic chemistry. Learning will take place through lecture, problem-solving and laboratory activities. This course covers slightly less complex material than the regular chemistry class due to its slower pace. The units of study in this course are broken up into smaller sections for ease of study.

CHEMISTRY
2 SEMESTERS; OPEN TO SOPHOMORES, JUNIORS AND SENIORS
PREREQUISITE: PHYSICS OR PHYSICS HONORS
This course provides a fundamental foundation in the study of matter and the changes matter undergoes. Students will investigate the different classes of chemical reactions, atomic theory, chemical bonding, the driving forces behind chemical reactions, properties of gases and an introduction to organic chemistry. Learning will take place through lecture, problem-solving and laboratory activities.

CHEMISTRY – HONORS
2 SEMESTERS; OPEN TO SOPHOMORES AND JUNIORS
PREREQUISITE: 'B' IN PHYSICS HONORS OR 'A' IN PHYSICS; RECOMMENDATION OF SCIENCE DEPARTMENT
This course provides a firm foundation in the concepts of chemistry. Topics of both inorganic and organic chemistry are explored. Students learn through computer simulation, lecture/discussion, problem solving and laboratory activities. Topic coverage is more in-depth and problem-solving is more challenging than in the regular chemistry class. Students should have a strong interest in the sciences and be proficient in algebra.

CHEMISTRY – ADVANCED PLACEMENT
2 SEMESTERS; OPEN TO JUNIORS AND SENIORS
PREREQUISITE: 'A' IN PHYSICS HONORS AND PERMISSION OF INSTRUCTOR. PRIOR CHEMISTRY EXPERIENCE IS REQUIRED
This course is a rapidly-paced, rigorous treatment of the concepts of first-year college chemistry. The coverage is primarily inorganic with some aspects of organic chemistry added for emphasis. Students engage in problem-solving and laboratory activities. This course is intended for students considering a career in the sciences and planning to take the AP chemistry exam. This class requires dedicated, highly self-motivated learners who have the ability to work independently. Students should also have a strong proficiency in algebra.

BIOLOGY
2 SEMESTERS; OPEN TO JUNIORS AND SENIORS
PREREQUISITE: PHYSICS AND CHEMISTRY
Biology is the study of living things as individuals and as part of an interwoven system of relationships. Topics include ecology, cell structure and function, genetics, evolution, and the diversity of living things. Laboratories, projects, readings and lectures will be used to master this material.

BIOLOGY I – HONORS
2 SEMESTERS; OPEN TO JUNIORS AND SENIORS
PREREQUISITE: RECOMMENDATION OF SCIENCE DEPARTMENT; PHYSICS; 'A' IN CHEMISTRY OR 'B' IN CHEMISTRY HONORS
The honors class is similar to Biology, but with more in-depth coverage of fewer topics. Students spend more time in lab. Students are required to express their understanding in both written and oral forms as well as to be reflective about their thinking processes. Students must be able to take responsibility for their own learning. This course requires student-designed laboratories and formal lab reports.

BIOLOGY II – ADVANCED PLACEMENT
2 SEMESTERS; OPEN TO JUNIORS AND SENIORS
PREREQUISITE: RECOMMENDATION OF SCIENCE DEPARTMENT; 'A' IN CHEMISTRY OR 'B' IN CHEMISTRY HONORS; 'A' IN BIOLOGY OR 'B' IN BIOLOGY HONORS
Advanced Placement Biology is a continuation of Biology I Honors, including evolution, vertebrate anatomy and physiology, plant anatomy and physiology and ecology. This course is taught using a freshman college-level curriculum. Students are required to express their understanding in both written and oral forms, as well as to be reflective about their thinking processes. Students must be able to take responsibility for their own learning. Requires student directed, inquiry based labs. Students who have completed Biology I and II will be prepared to take the Advanced Placement exam in May of senior year.

PHYSICS – ADVANCED PLACEMENT (MECHANICS)
2 SEMESTERS
PREREQUISITE: CALCULUS AB; CURRENT OR PREVIOUS ENROLLMENT IN CALCULUS BC AND CHEMISTRY; RECOMMENDATION OF SCIENCE DEPARTMENT; PERMISSION OF INSTRUCTOR
This course is taught at the first-year college level. Newtonian Mechanics is covered in depth, with a strong theoretical emphasis that includes frequent use of vectors and differential and integral calculus. An in-depth lab component reinforces and extends theoretical concepts learned in class. Students who have completed the course will be ready for the AP Physics exam.

ENVIRONMENTAL SCIENCE – ADVANCED PLACEMENT
2 SEMESTERS; OPEN TO JUNIORS AND SENIORS
PREREQUISITE: RECOMMENDATION OF CURRENT SCIENCE TEACHER, AN 'A' IN PHYSICS AND CHEMISTRY
The AP Environmental Science course provides students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems and to examine alternative solutions for resolving or preventing them. Environmental Science is interdisciplinary; it embraces a wide variety of topics from different areas of study. The AP Environmental Science course includes a strong laboratory and field investigation component. Students who have completed the course will be ready for the AP Environmental Science exam.