SCIENCE

Saint Ignatius College Prep requires three laboratory based science classes for graduation. All students must take physics, chemistry and biology. All Science courses are laboratory courses which meet eight to ten periods per eight day cycle depending on the level of the science course.

SCIENCE DEPARTMENT CORE COURSES FOR FRESHMEN AND SOPHOMORES

Students are required to take a year of physics, chemistry, and biology to complete their graduation requirements.

SC 630 PHYSICS
Two Semester Course
Freshmen

Physics is a lab-based introductory physics course. Students will learn basic lab procedures, how to measure accurately and precisely, and how to graph and interpret data. Students will use the scientific method for inquiry and experimentation in physics. The concepts of constant velocity and accelerated motion, Newton's laws of motion, energy, work, power, and momentum will be mastered by students through classroom learning and lab experimentation. Students are expected to demonstrate knowledge in this physics course through traditional assessments and lab performance. This course meets for four, 50-minute periods and two, 105-minute periods during each WOLFPACK cycle.

SC 640 H PHYSICS H
Two Semester Course
Freshmen
Prerequisite: Recommendation of the Department Chair, based on HSPT scores and math placement exam score.

Physics is a lab-based introductory physics course. Students will learn basic lab procedures, how to measure accurately and precisely, and how to graph and interpret data. Students will use the scientific method for inquiry and experimentation in physics. The concepts of constant velocity and accelerated motion, Newton's laws of motion, energy, work, power, and momentum will be mastered by students through classroom learning and lab experimentation. Students are expected to demonstrate knowledge in this physics course through traditional assessments and lab performance. This course meets for four, 50-minute periods and two, 105-minute periods during each WOLFPACK cycle.

SC 641 CHEMISTRY
Two Semester Course
Sophomores
Prerequisite: Physics SC 630 or Physics H SC 640 H.

This course builds on and integrates the concepts introduced in physics. It is a lab-based introductory chemistry course. Students will learn lab safety, procedure, and experimentation in chemistry. The concepts covered in this course include: the characterization of matter, chemical and physical changes, atomic theory and structure, chemical bonding, the periodic table, nomenclature, moles, stoichiometry, properties of water, and solutions. This course meets for four, 50-minute periods and two, 105-minute periods during each WOLFPACK cycle.

SC 651 H **CHEMISTRY H**

Two Semester Course
Sophomores
Prerequisite: Physics SC 630 or Physics H SC 640 H. Recommendation of the Department Chair.

This course builds on and integrates the concepts introduced in physics. It is a lab-based introductory chemistry course. Students will learn lab safety, procedure, and experimentation in chemistry. The concepts covered in this course include: the characterization of matter, chemical and physical changes, atomic theory and structure, chemical bonding, the periodic table, nomenclature, moles, stoichiometry, properties of water, and solutions. This course meets for four, 50-minute periods and two, 105-minute periods during each WOLFPACK cycle.

SC 603 **BIOLOGY**

Two Semester Course
Juniors and Seniors
Prerequisite: Chemistry SC 641 or Chemistry H SC 651 H

The course of the science program integrates physics and chemistry into an understanding of life's systems and processes. It is a lab-based introductory biology course. Students learn about the molecular basis of life through biomolecules, cells, the cellular processes of respiration and photosynthesis, and genetics. This knowledge is then applied to understand homeostasis, reproduction, evolution, and ecology. Students will perform dissections. This course meets for four, 50-minute periods and two, 105-minute periods during each WOLFPACK cycle. Additional field trip fees may be required.

SC 608 H **BIOLOGY H**

Two Semester Course
Juniors and Seniors
Prerequisite: Chemistry SC 630 or Chemistry H SC 640 H. Recommendation of the Department Chair.

The course of the science program integrates physics and chemistry into an understanding of life's systems and processes. It is a lab-based introductory biology course. Students learn about the molecular basis of life through biomolecules, cells, the cellular processes of respiration and photosynthesis, and genetics. This knowledge is then applied to understand homeostasis, reproduction, evolution, and ecology. Students will perform dissections. This course meets for four, 50-minute periods and two, 105-minute periods during each WOLFPACK cycle. Additional field trip fees may be required.

SCIENCE DEPARTMENT ELECTIVE COURSES

Students who have successfully completed the Physics, Chemistry, and Biology courses may choose from the following semester course pairings or any of the year-long courses as long as the student meets the requirements for enrollment.

Honors Electives Enrollment

Any student may choose to enroll in a science course for honors credit, as noted by an H. Enrollment in honors sections is done during the first few weeks in the semester. Taking a science course for honors credit includes extra work, projects, and assessments as outlined by the teacher in his/her course guidelines. The choice to enroll in an honors course should be carefully discerned by the student with guidance from his/her science teachers and guidance and college counselor(s). The Science Department recommends that students have a 3.00 or higher average in all previous science classes to enroll in an honors science course.

Advanced Placement Electives Enrollment

Students who have completed the required prerequisites may enroll in an Advanced Placement course.

Physics Courses	Introduction to Robotics SC 639/SC 649 H	Introduction to Engineering SC 642/SC 672 H
Biology Courses	Earth Science SC 645/SC 675 H	Environmental Science SC 647/SC 657 H
Year Long Courses	Anatomy & Physiology SC 650/SC 670 H Advanced Topics in Chemistry SC 687/SC 688 H Advanced Topics in Aquatic Science SC 625/ SC 628 H	
Advanced Placement Year Long Courses	SC 699 AP Physics 1 SC 690 AP Physics C SC 696 AP Environmental Science SC 697 AP Biology SC 698 AP Chemistry	

SC 625 **ADVANCED TOPICS IN AQUATIC SCIENCE**
SC 628 H Two Semester Course
Junior and Seniors

Advanced Topics in Aquatic Science is a course designed to enhance a student's understanding of the world that exists below the surface of the amazing and interconnected bodies of water that dominate Earth's surface. This interdisciplinary course will blend together the physics, chemistry, and biology of marine and freshwater systems. Topics will include: marine ecology, freshwater ecology, oceanography, the physics of swimming and diving animals, plant and animal taxonomy, and environmental sustainability. This course is a highly collaborative hands- on course in which students explore the underwater world with a variety of laboratory investigations and occasional field trips (additional fees may apply). Honors students will be required to complete additional coursework.

SC 639 **INTRODUCTION TO ROBOTICS**
SC 649 H One Semester Course
Junior and Seniors

This course is designed for students who may have an interest in engineering or computer science. This hands-on, highly collaborative course will focus on building and programming a robot using LEGO Mindstorms to complete a wide range of challenges. Students will use python, a modified text-based coding language, to program their robots to complete assigned tasks. Throughout these tasks, students will be introduced to engineering concepts including: basic design and constraints, troubleshooting, prototyping, optimization, gears and drive trains, computer logic, sensors, and feedback loops. Laboratory classes will focus on robot construction and computer programming. However, students should note that this course will require additional time outside of the lab periods to build fully functioning robots in addition to regular homework assignments. Students will be required to document and present their work after each module. Honors students will be required to complete additional assignments. Additional course fees required. This course must be taken with SC 642/SC 672 H Introduction to Engineering.

SC 642 **INTRODUCTION TO ENGINEERING**
SC 672 H One Semester Course
Juniors and Seniors

This course is an introduction to several types of engineering: mechanical engineering, electrical engineering, computer engineering, and civil engineering. Students will have opportunities to perform experiments and complete projects from each of the engineering disciplines introduced. Students will learn the engineering design process and apply it to their experiments and projects. Honors students will be required to complete additional projects and assignments. This course meets for four 50-minute class periods and two 105-minute lab periods in a WOLFPACK cycle. This course must be taken with SC 639/SC 649 H Introduction to Robotics.

SC 645 **EARTH SCIENCE**
SC 675 H One Semester Course
Juniors and Seniors

This course will study the earth through a combination of some or all of the following themes: Geology, Oceanography, Meteorology. The course will be broad-based and cover some of the following topics: Dynamic Earth—plate tectonics, earthquakes and volcanoes; Composition of the Earth—earth chemistry, minerals of the Earth's crust and rock; History of the Earth—the rock record, Earth's past and history of the continents; Oceans—ocean water and movements of the ocean; Atmospheric Forces—the atmosphere, water in the atmosphere, weather and climate. Honors students will be required to complete additional assignments. Additional field trip fees may be required. This course must be taken with SC 647/SC 657 H Environmental Science.

SC 647 **ENVIRONMENTAL SCIENCE**
SC 657 H One Semester Course
Juniors and Seniors

Environmental science is an interdisciplinary study combining ideas and information from the natural sciences (biology, chemistry, and geology) with social sciences (economics, government and policy, and ethics) to present a general framework for the interconnectedness among and within earth's ecosystems. Particular emphasis will be devoted towards current topics in the environment and sustainable options for our world. Honors students will be required to complete additional assignments. Additional field trip fees may be required. This course must be taken with SC 645/SC 675 H Earth Science.

SC 650 **HUMAN ANATOMY & PHYSIOLOGY**
SC 670 H Two Semester Course
Juniors and Seniors

This course is an in-depth study of the structure and function of the human body. The course highlights the chemical, cellular, and tissue levels of organization and the anatomy and physiology of the human body systems. In the laboratory, students will examine anatomical models and preserved specimens and conduct animal dissections as well as computer-simulated experiments. This course will take full advantage of iPad anatomy and physiology applications. Honors students will be required to complete additional assignments. Additional field trip fees may be required.

SC 687 **ADVANCED TOPICS IN CHEMISTRY**
SC 688 H Two Semester Course
Juniors and Seniors

This course is designed to build on the chemistry concepts covered in the Physics, Chemistry, and Biology courses. Advanced Topics in Chemistry will cover the concepts of equilibrium, limiting reagents, kinetics, thermodynamics, and nuclear chemistry. There will be an emphasis on the everyday application of chemistry, learning by doing, and completion of labs that improve students' Chemistry lab skills. Honors students will be required to complete additional assignments. Successful completion of this course gives students a taste of college level chemistry.

ADVANCED PLACEMENT SCIENCE/INDEPENDENT RESEARCH IN SCIENCE

Students in the classes of 2024 and 2025 wishing to enroll in AP Environmental Science (SC 696), AP Biology (SC 697), AP Chemistry (SC 698), or AP Physics 1 (SC 699) must have completed the required program of Physics, Chemistry, and Biology, have a 3.50 GPA or higher average in all previous science classes, and have the recommendation of the Science Department Chair. Students wishing to enroll in AP Chemistry (SC 698) or AP Physics 1 (SC 699) must also have a 3.50 GPA or higher average in all previous math classes. Students wishing to enroll in AP Physics C (SC 690) must have completed the required program of Physics, Chemistry, and Biology and have the recommendation of the Math and Science Department Chairs.

Students in the class of 2026 and 2027 must have the recommendation of Math and Science Department Chairs.

SC 689 INDEPENDENT RESEARCH
Two Semester Course
Seniors
Prerequisite: Approval of research proposal by research director and Science Department Chair.
The Independent Research course is a full-year elective open to students who have completed the required Physics, Chemistry, and Biology courses. Individual research project proposals are submitted for approval prior to the academic year. During the school year, students will finalize a proposal, prepare a written experimental design, perform the experiment, write a final research paper and participate in an annual science symposium. After the initial proposal is approved by the research director, a faculty mentor will be assigned to assist the research student; it is the responsibility of the student to actively work on his or her research throughout the entire academic year. Opportunities for research outside the research lab can be investigated and implemented, if appropriate. The science department funds research projects. Students who would like more information about this course should consult either a science teacher or the research director. Students earn a pass/fail grade for their work first semester and a letter grade for their work second semester.

SC 690 AP ADVANCED PLACEMENT PHYSICS C: MECHANICS, ELECTRICITY AND MAGNETISM
Two Semester Course
Juniors and Seniors ONLY with recommendation of Math and Science Department Chairs.
The Advanced Placement Physics C: Mechanics, Electricity and Magnetism course is equivalent to a first-year college course in calculus-based physics. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy and power; and mechanical waves and sound. It will also cover electrostatics; conductors, capacitors and dielectrics; electric circuits; magnetic fields; and electromagnetism. This course serves as preparation for the College Board Advanced Placement Exam. This course meets for two, 50-minute periods and four, 105-minute periods during each WOLFPACK cycle. Additional online homework fees required.

SC 696 AP ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE

Two Semester Course

Juniors and Seniors

The Advanced Placement Environmental Science course offers a curriculum equivalent to a college-level Foundations of Environmental Science Course. This course will introduce concepts that form the basis of environmental science, including elemental cycling, energy flow/transformation, and the interconnectivity among and within ecosystems. Upon completion of the course students will be able to identify environmental problems, evaluate the relative risks associated with these problems, and scrutinize alternative solutions for resolving and/or preventing them. Related environmental policy, management and social perception will also be examined. This course serves as preparation for the College Board Advanced Placement Exam. Students should have a GPA of 3.50 or higher in all previous science courses and recommendation of the science department chair to enroll.

SC 697 AP ADVANCED PLACEMENT BIOLOGY

Two Semester Course

Juniors and Seniors

Advanced Placement Biology is a comprehensive course designed to be the equivalent of a first-year college course. The fundamental principles of biology are investigated in greater depth and detail than in the introductory Biology course. Special emphasis will be placed on the following areas: cellular molecular biology, organismal biology, and ecological, evolutionary and developmental biology. This course meets for two 50-minute periods and four 105-minute periods during each WOLFPACK cycle. Additional field trip fees required. This course serves as preparation for the College Board Advanced Placement Exam. Students should have a GPA of 3.50 or higher in all previous science courses and recommendation of the science department chair to enroll. Starting with the class of 2026 students will need to complete Biology as a prerequisite or be given permission by the department chair.

SC 698 AP ADVANCED PLACEMENT CHEMISTRY

Two Semester Course

Juniors and Seniors

The Advanced Placement Chemistry course is equivalent to a college-level course in general chemistry. Students study matter and its changes, as well as the energy changes associated with physical and chemical reactions. Topics include: atomic theory and structure, states of matter, stoichiometry, equilibrium, acids and bases, chemical kinetics, oxidation/reduction, and thermodynamics. Understanding chemical concepts is stressed, but there is considerable emphasis on mathematical calculations based on chemical principles. Laboratory work highlights the chemical concepts covered in class as well as descriptive chemistry. This course meets for two 50-minute periods and four 105-minute periods during each WOLFPACK cycle. Additional online homework fees required. This course serves as preparation for the College Board Advanced Placement Exam. Students should have a GPA of 3.50 or higher in all previous math and science courses and recommendation of the math and science department chairs to enroll.

SC 699 AP ADVANCED PLACEMENT PHYSICS 1

Two Semester Course

Juniors and Seniors

The Advanced Placement Physics 1 course is equivalent to a first-semester college course in algebra-based physics. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy and power; and mechanical waves and sound. It will also introduce electric circuits. This redesigned course reflects changes directed by the College Board including an emphasis on inquiry-based lab activities and an adjustment to the course timeline which gives students the time needed to explore and deepen their understanding of Newtonian mechanics. This course serves as preparation for the College Board Advanced Placement Exam. This course meets for two 50-minute periods and four 105-minute periods during each WOLFPACK cycle. Additional online homework fees required. Students should have a GPA of 3.50 or higher in all previous Math and Science courses and recommendation of the Math and Science Department Chair to enroll.