

SCIENCE



The Science Department of Cathedral Prep has a rich tradition of preparing students to enter science and engineering programs at the collegiate level. Scientific literacy is essential for successful careers in today's technological society.

A comprehensive program including four years of science is required for graduation. Most students graduate with the following sequence of courses: Integrated Science, Biology, Chemistry and Physics. The courses are offered in three levels: regulars, honors, and advanced placement. The Department also offers additional course electives that earn curricular credits in science.

Determination of placement will be made in accordance with Science Department guidelines.

Comprehensive lab exercises intended to reinforce basic science theory and principles are included in each course. Lab exercises teach hands-on skills, data collection analysis, and formation of scientific conclusions.

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544 Integrated Science – Regulars	Two Semesters
Grade: 9	Credit: 1.0
Prerequisite: Guidance Placement	
<p>The focus of Freshman Integrated Science is to provide students with a foundation upon which to build throughout their years at Prep. An integrated science course connects one area of science to another; it also relates science to technology, society, and other disciplines. Units of study include introductory level instruction in Chemistry, Biology, Earth Science, Physics and Astronomy. Students will be involved in laboratory activities, cooperative learning activities, and critical thinking exercises. Emphasis will be placed on students developing their ability to think, learn, and solve problems.</p>	
543 Integrated Science – Honors	Two Semesters
Grade: 9	Credit: 1.0
Prerequisite: Guidance Placement	
<p>The Honors Integrated Science course covers the same content as the regular's course, but with a more in-depth approach. It requires a higher level of reading comprehension, and higher level thinking skills are employed in all facets of the course. Much more independent work is expected of the students, including a different project each quarter. Determination of placement will be made according to science department guidelines.</p>	
533 Biology I Regulars	Two Semesters
Grade: 10	Credit: 1.0
Prerequisite: Integrated Science or Equivalent	
<p>Biology is the study of the structure and function of living things. Biological study involves other scientific disciplines such as Chemistry, Physics, and Geology. The topics included in the course include: tools of the biologist, measurement, organic chemistry, cell structure and function, cell division, maintenance, genetics, and diversity. The student will explore these concepts through laboratories, projects, group work, research, demonstrations, and discussion.</p>	
532 Biology I Honors	Two Semesters
Grade: 10 (also Grade 9 with placement testing)	Credit: 1.0
Prerequisite: Integrated Science or Testing	
<p>Structure and function are a universal theme of life. Biology focuses on the patterns that exist throughout living organisms from sub-atomic particles to the biosphere of planet earth that supports all life. The honors level allows the more gifted student to receive a more detailed approach for all the concepts covered. The class utilizes a community college level text and requires better to reading/comprehension skills. Numerous outside ancillary materials are incorporated in the course. The textbook is used roughly a third of the time for reference. Microscopy work is a central theme, along with model building in the laboratory setting. The course is based in molecular and cellular biology.</p>	
523 Chemistry I Regulars	Two Semesters
Grade: 11	Credit: 1.0
Prerequisite: Integrated Science or Equivalent and Biology	
<p>The Chemistry Regulars course is both suitable for students who will not pursue the subject further as well as those who plan to take introductory college chemistry. The course emphasizes the fundamentals of general chemistry. To this end, the following topics are covered: measurement, matter-changes and energy, atomic theory, atomic structure, nomenclature, chemical reactions, chemical bonding, stoichiometry, The gas laws, solutions, and acids & bases. Along with these fundamentals, the students will develop critical thinking and problem solving skills, not only to use in chemistry, but by extension, be of value in other learning situations.</p>	

522 Chemistry I – Honors	Two Semesters
Grade: 10, 11	Credit: 1.0
Prerequisite: Biology I and approval of instructor	
The Chemistry I Honors course is an accelerated college-preparatory course directed to the student with above-average aptitude in mathematics and science. The theory and principles of general chemistry are developed, emphasizing stoichiometry, thermochemistry, atomic and molecular structure, chemical bonding, properties of materials, solutions, acids and bases, and an introduction to kinetics and equilibrium. Laboratory exercises are coordinated with lectures to reinforce basic theory and develop “hands-on” skills.	
513 Physics – Regulars	Two Semesters
Grade: 12	Credit: 1.0
Prerequisite: Algebra, Chemistry	
The course is divided into six areas of study: mechanics, properties of matter, heat, sound and light, electricity and magnetism, and finally atomic/nuclear physics. Concepts are stressed with algebra and a minimal amount of trigonometry. The program includes: videotapes, concept-development practice book, laboratory manual and overhead transparencies.	
512 Physics – Honors	Two Semesters
Grade: 12	Credit: 1.0
Prerequisite: Algebra II, Trigonometry, Chemistry	
The honors course uses a non-calculus college text with a vast number of problems ranging from simple to highly challenging in scope. All areas of physics from mechanics to cosmology are covered. Laboratory experiments aid in the application of the course content.	
511 Physics – AP	Two Semesters
Grade: 12	Credit: 1.0
Prerequisite: Department approval, concurrent Calculus	
The AP Physics course is an accelerated college-preparatory course directed to the student with exceptional aptitude in mathematics and science. The theory and principles of general Physics are developed, emphasizing mechanics (statics and dynamics), vibration and wave theory as applied to sound and optics, thermodynamics, electrostatics and electric current and magnetism. Concurrent study of calculus is helpful, but not required. Laboratory exercises are coordinated with lectures to reinforce basic theory.	
529 Environmental Biology - Honors	Two Semesters
Grades: 11, 12	Credit: 1.0
Prerequisite: Biology I with a B or higher	
Environmental Biology is the study of the interaction between organisms and their environment. This relatively young science is evolving quickly so the course will be built around the most up to date discoveries and ideas. Topics will include systems, population dynamics, resource use, energy flow, water, pollution, and environmental law. Students will take field trips, perform lab activities, read and analyze case studies, perform research, and participate in discussions of fact and opinion.	
531 Biology II AP	Two Semesters
Grades: 11, 12 (Grade 10 with recommendation)	Credit: 1.0
Prerequisite: Biology I Honors	
The AP Biology course is a college level course that parallels the molecular and cellular Biology course (SA122) at Gannon University. This would be the initial college course for a Biology major. Biochemistry, cell structure and function, genetics (Mendelian & molecular), energetics along with photosynthesis and respiration are emphasized in the course sequence.	

521 Chemistry II – AP	Two Semesters
Grades: 11, 12	Credit: 1.0
Prerequisite: Completion of Chemistry I and approval of instructor	
<p>The Chemistry II – AP course is offered to the advanced student as a college-level course in general chemistry. Fundamental principles presented in Chemistry I are reviewed and applied to complex problems. More advanced topics, such as equilibria of weak electrolytes, thermodynamics, electrochemistry, and nuclear chemistry are addressed. An introduction to organic chemistry is presented. Laboratory exercises emphasize qualitative analysis and spectroscopy and are intended to develop skill in classical techniques and critical observation. Additional experiments are coordinated with lectures to reinforce basic theory.</p>	
527 Human Anatomy and Physiology	One Semester
Grades: 11, 12	Credit: 0.5
Prerequisite: Biology (approval of instructor for grade 10)	
<p>Human Anatomy and Physiology is a one semester science elective offered to those students who have completed Biology with a “B” average or better. This course is designed to prepare the student for anatomy and physiology at the college level. The objectives of the course include: 1) To develop the student’s understanding of the human body as a system emphasizing selected body systems. 2) To develop the student’s understanding of the anatomical components of selected body systems. 3) To develop the student’s understanding of the physiological processes of selected body systems. This is an intense course requiring the learning of large amounts of material. Laboratory work is evaluated with practicums.</p>	

Please Note: Most one semester courses earn 0.5 credits, while most two semester (year-long) courses earn a total of 1.0 credit.