

UPPER SCHOOL SCIENCE DEPARTMENT COURSE DESCRIPTIONS

Science Department Notes:

- *4.0 credits of Science are required for Graduation.*
- *As a minimum, all students must complete two lab sciences: Biology and Chemistry.*
- *1.0 credits of Science must be taken each year of enrollment in the Upper School.*
- *Students may enroll in two science courses in grade 11/12 in which case one course will count as an elective.*
- *All full year (1.0 credit) AP courses require summer assignments.*

Biology (1.0 Credits)

The biology program is designed to provide Grade 9 students with a solid background in preparation for freshman level college biology. With the major emphasis on molecular biology, the students gain experience in lab procedures and the use of lab equipment as they participate in units covering cytology, biochemistry, genetics, microbiology, ecology, and zoology.

Prerequisite: Physical Science (grade 8)

Textbook: Biology, Glencoe 2017 Edition ISBN: 978-0076774289

Chemistry (1.0 Credits)

Chemistry is the study of the components of matter and how these components behave and interact with one another. The course provides Grade 10 students an overview of the periodic table, chemical bonding, molecular structures, inorganic nomenclature, gas laws, balancing chemical equation, oxidation and reduction, stoichiometry, and acid/base chemistry

Prerequisite: Algebra I, Physical Science and Biology

Textbook: Modern Chemistry: 2012 edition ISBN: 978-0547586632

Advanced Placement (AP) Chemistry (1.0 Credits) and Lab (0.5 Credits)

Advanced Placement Chemistry is a college level chemistry course. This course will cover all topics in a college level chemistry I and II course. Major emphasis is placed on nomenclature, reaction mechanisms, equilibrium, kinetics, thermodynamics, bonding, and laboratory skills. AP Chemistry requires a mandatory separate lab class. Note: The lab class is periodically used for a study hall.

Prerequisites: Chemistry

AP Chemistry Course Enrollment Standards:

- Teacher Recommendation
- 85% test average in Algebra II Honors and Chemistry

Textbook: Chemistry, 6th edition ISBN: 978-0618221561

Anatomy & Physiology Honors (1.0 Credits)

This advanced course provides Grade 11 and 12 students with an overview of the anatomy and physiology of the human body. Most organ systems are covered. Speakers from the medical field, animal dissections, and discussions of current health issues make up a large part of class time.

Textbook: Hole's Human Anatomy & Physiology, McGraw Hill, 15th Edition, ISBN: 978-0076809967

Environmental Science (1.0 Credits)

Environmental science is a year-long Senior course designed to demonstrate academic connections between a variation of science methods including biology, chemistry, and physics. The class provides students with a logical and practical variety of applications of various scientific concepts. The goal of this class is to develop and increase students' knowledge of environmental challenges while refining scientific critical thinking skills.

Textbook: William P. Cunningham and Mary Ann Cunningham, Environmental Science, 14th Edition (2017), ISBN: 9781260153125

Physics Honors (1.0 Credits)

Physics Honors is designed for Senior students. Physics Honors follows a program that provides for the development of science skills through the use of modeling as it covers concepts ranging from Motion, Acceleration, Forces, Work, Power, Energy, Gravity, Waves and Wave Properties, and Sound. Graphical analysis develops the equations and relationships that are the focus of the course in kinematics (motion) and Newtonian principles.

Prerequisite: Precalculus or Precalculus Honors

Physics Course Enrollment Standards:

- Teacher Recommendation
- 85% test average in PreCalculus, Precalculus Honors and Chemistry

Textbook: Physics (Pearson: James S. Walker – 2014) ISBN: 9780131371156

Advanced Placement (AP) Physics 1 (1.0 Credits)

AP Physics-1 is a College Board-approved course that prepares Senior students for their first semester in college physics. It examines the mechanics of motion, linear and circular, in both one and two dimensions. The dynamics of motion are examined through Newton's Laws of Motion and the Law of Gravitation while applying principles of thermodynamics to conserve energy and momentum. This culminates in the study of simple harmonic motion, vibrational energy, and periodic motion. The focus of the course is experimentation and the scientific process to make predictions based on well-understood concepts of motion. Mathematics is the tool used to explain and understand those concepts but is not the focus of the course. Guided inquiry and open inquiry lab activities with regular lab reports will facilitate the focus of this course.

Prerequisite: Precalculus Honors

AP Physics Course Enrollment Standards:

- Teacher Recommendation
- 85% test average in PreCalculus Honors and Chemistry

Textbook: College Physics for AP Courses, OpenStax. 2015m Digital Copy ISBN: 9781947172173 (recommended) or Hardcover: ISBN: 9781938168932