

# DEPARTMENT OF SCIENCE

## BIOLOGY-PREPARATORY

*Grade: 9-10*

*Prerequisites: Integrated Physics and Chemistry*

*Credit: 1 credit; ½ per semester*

Preparatory Biology is an introductory lab based course. This two-semester course offers an introduction to cell structure and chemistry, classification of living organisms, photosynthesis and cellular respiration, genetics, and the systems of organisms such as digestion, circulatory, muscular, skeletal, respiratory, endocrine, nervous, excretory and reproductive. Instruction will include current findings in biology, particularly genetics, diseases and ecology.

## BIOLOGY 1 - PRE AP

*Grade: 9 – 10*

*Prerequisites: Integrated Physics and Chemistry*

*Credit: 1 credit; ½ per semester*

The Pre AP Biology course is designed to be the precursor to the AP Biology course. Topics covered in this two-semester course include those covered in the Preparatory Biology course; however, the topics are covered in more depth and there is an emphasis on the biochemical nature of systems. Outside projects will be required of all students. Independent conceptualization is required.

## AP BIOLOGY

*Grade: 11 – 12*

*Prerequisites: Integrated Physics and Chemistry, Biology I and Chemistry*

*Credit: 1 credit; ½ per semester*

The AP Biology course is designed to be the equivalent of a college introductory biology course. This two-semester course will prepare students for the College Board AP Biology Examination and the SAT II Biology achievement test. AP Biology includes those topics covered in a college biology course. This course differs significantly from the first biology course with respect to the kind of textbook used, the range and depth of topics covered, the kind of laboratory work done by students, and the time and effort required of all students. Students electing this course should plan on taking the AP exam in May.

## CHEMISTRY I

*Grade: 10 – 12*

*Prerequisites: Algebra 2 or concurrent enrollment in Algebra 2*

*Credit: 1 credit; ½ per semester*

This two-semester course is essential for all college-bound students. Many of the topics covered in the preparatory course are also included in the Pre-AP course but they are not covered in as much depth. Descriptive chemistry is emphasized. The scope and sequence of the course allows the development of basic chemistry concepts and principles. Students learn to apply their mathematical and analytical reasoning to problem solving in chemistry. Topics covered include scientific measurement, classification of matter, atomic structure, periodicity, formulas, chemical reactions, gas behavior, solutions, types of compounds, nuclear reactions, acid-base theories and enthalpy changes in reactions.

## CHEMISTRY 1 – PRE-AP

*Grade: 10 – 12*

*Prerequisites: Algebra 2 or concurrent enrollment in Algebra 2*

*Credit: 1 credit; ½ per semester*

The Pre AP Chemistry is a precursor to the AP Chemistry class. This class is directed towards preparing students for the AP class and the College Placement exams. The scope, sequence and strategies used in this class trains students in critical and analytical thinking, necessary skills to be successful in a college level class. The concepts are taught in an inquiry mode to facilitate problem solving and higher level thinking skills. All of the topics covered in the preparatory class are covered in greater depth with an emphasis on mathematical and multi-level problem solving. Student centered laboratory work is an integral part of the course. Some of the topics included are mole concept, atomic theory including Quantum theory, analysis of compounds, stoichiometry, reactions, periodicity, bonding, kinetic molecular theory and gas behavior, thermochemistry and spontaneity of reactions, solutions, equilibrium, kinetics, acid-base reactions, redox reactions and nuclear chemistry.

## **AP CHEMISTRY**

*Grade: 11 – 12*

*Prerequisites: Pre-Calculus or concurrent enrollment in Pre -Calculus; Chemistry 1*

*Credit: 1 credit; ½ per semester*

AP Chemistry is a continuation of Pre-AP Chemistry 1 and is designed to prepare students for the A exam. Students completing this two-semester course should be able to place out of their first year of chemistry in college or should be well prepared for college chemistry. This is a general chemistry course. Topics include stoichiometry, gases, thermochemistry, atomic structure and periodicity, bonding and molecular geometry, states of matter, complex ions, solution chemistry, kinetics, equilibrium, acids and bases, electrochemistry, and nuclear chemistry. College level laboratory work is an essential part of this program. Students completing this course will be well prepared to take the SAT II chemistry achievement test. Students electing this course should plan on taking the AP exam in May.

## **PHYSICS 1 - PREPARATORY**

*Grade: 11 – 12*

*Prerequisites: Chemistry 1; completion or concurrent enrollment in Pre-calculus*

*Credit: 1 credit; ½ per semester*

This two-semester course surveys elementary topics in physics including classical mechanics, waves, electrostatics, conservation laws for energy and momentum, electricity, and magnetism. Topics in modern physics, relativity and quantum phenomena, are introduced. Mathematical descriptions are primarily algebraic in nature.

## **PHYSICS 1 - PRE AP**

*Grade: 11 – 12*

*Prerequisites: Chemistry 1; completion or concurrent enrollment in Pre-calculus; concurrent enrollment in Calculus recommended*

*Credit: 1 credit; ½ per semester*

This two-semester course surveys elementary topics in physics including classical mechanics, waves, electrostatics, conservation laws for energy and momentum, electricity, magnetism. Topics in modern physics, relativity and quantum phenomena, are introduced. Mathematical descriptions are primarily algebraic in nature, but include some calculus-based equations.

## **AP PHYSICS**

*Grade: 11 – 12*

*Prerequisites: Chemistry 1; completion or concurrent enrollment in Pre-calculus; concurrent enrollment in Calculus recommended*

*Credit: 1 credit; ½ per semester*

This two-semester course surveys elementary topics in physics including classical mechanics, waves, electrostatics, conservation laws for energy and momentum, electricity, magnetism. Topics in modern physics, relativity and quantum phenomena, are introduced. Mathematical descriptions are primarily calculus-based. Students completing this course will be well prepared to take the SAT II Physics achievement test. Students electing this course should plan on taking the AP exam in May.

## **AP ENVIRONMENTAL SCIENCE**

*Grade: 11 – 12*

*Prerequisites: Integrated Physics and Chemistry; Biology*

*Credit: 1 science elective credit; ½ per semester*

The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts and methodologies required to understand the interrelationships of the natural world. Also 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 and/or preventing them. Topics will include air and water pollution, endangered species, human population, recycling, ecology and energy. In addition to an in-depth study of the course topics, students will gain exposure to professional literature in the field. This two-semester laboratory course is designed to be the equivalent of an introductory college course in environmental science. Students electing this course should plan on taking the AP exam in May. This course involves some outdoor fieldwork and required service hours.