

VALOR CHRISTIAN HIGH SCHOOL

INFLUENCE THROUGH EXCELLENCE

SCIENCE

The Valor Science Department's primary mission is to provide all students the foundation of excellence in the field of science. Whether as scientists or as scientifically literate citizens, students must be well-prepared to enter a world of increasing social and technological complexity. The science course offerings are designed to provide a variety of opportunities to engage with the wonderful world around them – in the classroom, in the laboratory, and in field work. Critical thinking, both individual and collaborative, are at the core of our philosophy. The students will engage in experiential learning that promotes scientific inquiry and analytical thinking.

SCI 110 (112, 114)

Biology I

Encompasses scientific method, basic biochemistry, cell physiology, biotechnology, genetics, origins, anatomy & physiology, taxonomy, and ecology. Students follow a comprehensive laboratory program, including numerous dissections. (*Single gender classes available 112-SGM, 114-SGF*)

Grade: 9, 10; **Prerequisites:** None; **Term:** Full Year; **Credit:** 1.0

SCI 120

Honors Biology I

Covers similar topics as Biology I, but in greater depth and detail. Students will also write reflections that connect class work with their everyday world. The laboratory curriculum is also enhanced relative to Biology I, and tests emphasize higher order thinking.

Grades: 9, 10; **Prerequisites:** Grade of "A" or above in previous science course; **Term:** Full Year; **Credit:** 1.0

SCI 510

AP Biology

Encompasses scientific method, biochemistry, cell structure & function, biotechnology, genetics, evolution & origins, anatomy & physiology, taxonomy, behavior, and ecology. Students apply broad-level concepts to detailed biological principals. The laboratory component includes 12 labs that are specifically related to topics on the AP exam. Students are expected to take the AP Biology exam. *The cost for the AP exam is \$86.*

Grades: 10, 11, 12; **Prerequisites:** Grade of "A" in Biology I; Grade of a "B" or higher in Biology I Honors; Grade of "A" in Chemistry; Grade of "B" or higher in Chemistry Honors or Teacher approval. **Term:** Full Year; **Credit:** 1.0

SCI 210

Chemistry

Teaches basic principles, laws, theories and techniques of chemistry, stressing concepts, applications and problem-solving skills. Labs reinforce topics and follow the scientific method. Curriculum includes scientific measurement, atomic structure, the mole concept, stoichiometry, nomenclature, chemical equations, gas laws, liquid and solid behavior, chemical bonding, molecular and ionic structure and acid/base and redox chemistry.

Grades: 10, 11, 12; **Prerequisites:** Biology I, Algebra 1; **Term:** Full Year; **Credit:** 1.0

SCI 220

Honors Chemistry

Prepares students for subsequent advanced classes in mathematics and science. This fast-paced and demanding course is tailored for sophomores and juniors in honors track classes. Students learn an expanded Chemistry curriculum, focusing on concepts, applications and problem-solving skills.

Grades: 10, 11, 12; **Prerequisites:** Grade of an "A" in Biology I or Grade of "B" or higher in Biology I Honors; Grade of B- or higher in Algebra I - Math teacher signature required or Teacher approval. **Term:** Full Year; **Credit:** 1.0

SCI 520

AP Chemistry

This course is the equivalent to a first-year university chemistry program. It encompasses topics such as thermodynamics, kinetics and reaction mechanisms, chemical equilibrium, acid/base chemistry, electrochemistry, and nuclear chemistry. Course work emphasizes the theory behind results. Students must be prepared to explain their observations in light of concepts discussed in class. As with any chemistry course, strong math skills are essential to student success. Students are expected to take the AP Chemistry exam in May. *The cost for the AP exam is \$86.*

Grades: 10, 11, 12; **Prerequisites:** Grade of "A" in Biology I or "B" or higher in Biology I Honors, "A" in Chemistry or "B" or higher in Chemistry Honors; Concurrent enrollment in Algebra II with a B or higher - Math teacher signature required or teacher approval. **Term:** Full Year; **Credit:** 1.0

SCI 310 Physics

Conceptual Physics is a full year class highly recommended as an introduction to a more mathematically rigorous AP Physics course. This course is well suited for students seeking a liberal arts or non science based degree at a competitive college. This course requires an understanding of algebra and trigonometry and is designed to help students fully appreciate our world and the laws of nature. This course covers Newtonian Mechanics, Sound, Electricity, Magnetism and Light.

Grades: 10, 11, 12; **Prerequisites:** Concurrent enrollment in Algebra II; completion of Biology or Biology Honors and Chemistry or Chemistry Honors; or Teacher approval; **Term:** Full Year; **Credit:** 1.0

SCI 320 Honors Physics

Honors Physics is a full year Algebra based physics course that will cover about 10 percent less material than the AP Physics B course covers. This course will use the same college level text as the AP Physics B course and will provide an excellent introduction to algebra based college Physics for those students desiring to take AP Physics B or AP Physics C (Mechanical) courses before graduation from Valor. This is also an excellent course for students seeking a rigorous Physics course to prepare them for Algebra or Calculus based Physics course in College. This course will cover Newtonian Mechanics, Energy, Sound, Electricity, Magnetism, Waves, and Optics. The students will participate in a final capstone rocket launching project. This course will incorporate college level physics labs to reinforce the physics concepts covered and to develop critical thinking skills.

Grades: 11,12; **Prerequisites:** Grade of "C" or higher in Algebra II and Chemistry and Teacher approval; **Term:** Full Year; **Credit:** 1.0

SCI 530 AP Physics B

The AP Physics course is designed to be the equivalent of the general physics course taken during the first college term. This course will provide students with a depth of understanding of mechanics and electromagnetism fundamentals and a thorough competence in dealing with problem solving with the aid of calculus. Emphasis will be placed on knowledge related to kinematics, kinetics, energy, momentum, rotational motion, harmonic motion, electro-statics, electric and magnetic fields, electric potential, DC circuits, induction and inquiry based laboratory work. Students should plan on a demanding workload and will take the AP Physics exam given by the college board in May. *The cost for the AP exam is \$86.*

Grades: 10,11,12; **Prerequisites:** Completion of Biology and Chemistry; Concurrent enrollment in pre-calculus or higher; Grade of B or higher in Algebra II and Physics or Teacher approval; **Term:** Full Year; **Credit:** 1.0

SCI 230 Marine Biology

This course is only offered in the fall semester

Marine Biology is a one semester, lab and project-based elective course which will cover classification, dissection, and understanding of marine organisms. The class will also cover many aspects of the physical and chemical properties of the ocean including waves and tsunamis, pressure, and ocean chemistry. Students will stock and maintain their own saltwater tanks and have the opportunity to get SCUBA certified. An optional trip to the Sea of Cortez to study whale sharks is currently being planned. *This elective course will count toward the science credits needed for graduation, but check with your Academic and College Counselor before substituting one of these courses for a traditional college preparatory class.*

Grade: 10,11,12; **Prerequisites:** Biology or Honors Biology; **Term:** Semester; **Credit:** 0.5

SCI 240 Human Anatomy and Physiology

This is a collegiate level introductory human anatomy & physiology course with emphasis on clinical applications in medicine and surgery. Students will become familiar with basic anatomical and medical terminology as they learn details about the 11 organ systems. Students will engage in organ dissection and will see various surgical and medical procedures. They will also learn some basic medical procedures such as suturing and casting. The class is geared to those students who may be considering a career in medicine/allied health, and goes into much more detail than SCI-315. Students will be exposed to mature conversations and will see all parts of anatomical detail. Students who take this course can opt for dual college credit through Northwest Nazarene University.

Grade: 11,12; **Prerequisites:** A "B" or higher in Biology or Chemistry; **Term:** Full Year; **Credit:** 1.0

SCI 260 Environmental Science **This course will not be offered during the 2011-2012 school year.*

This course is designed to introduce the student to the concepts, problems, connections and solutions involved in environmental issues. Environmental Science is an introductory, general science course that helps students understand the natural environment and the environmental problems the world faces. This course is interdisciplinary, involving a wide variety of topics and considerations from different specialty areas of study. It is the study of God's creation, our stewardship, and the interconnectedness of living organisms to each other and to the world around them. Laboratory and field investigations are the primary means for developing problem-solving skills. *There will also be an emphasis on renewable resources. This elective course will count toward the science credits needed for graduation, but check with your Academic and College Counselor before substituting one of these courses for a traditional college preparatory class.*

Grade: 10,11,12; **Prerequisites:** Biology or Honors Biology; **Term:** Semester; **Credit:** 0.5

SCI 540**AP Physics C Engineering Mechanics**

AP Physics C is a full year Calculus based course that is equivalent to the first semester Calculus based general physics course that is required for engineering and science majors in college. This course is an in depth college level course tailored to provide the Calculus based mechanics Physics principals and requirements for those seeking degrees in; Engineering, Technology, Environmental Science, and all Science disciplines requiring a calculus based Physics background. This course is designed for students to validate their first College level Calculus based Newtonian Mechanics Physics lab course and go directly to their college Calculus based Electricity and Magnetism Physics lab course. This course will cover Kinematics 1 and 2D, Newtonian Mechanics, Circular motion, Orbital Mechanics, Work and Energy, Static stress, Fluids Mechanics, Oscillations, Waves, Sound, and Thermodynamics. This course will incorporate college level physics labs to reinforce the physics concepts covered and to develop critical thinking skills. Students should plan on a demanding workload that will culminate in taking the AP Physics C Mechanics exam given by the College Board in May. Four engineering design projects will be done in this course to give the students an opportunity to apply their Physics knowledge and an introduction of college engineering disciplines.

Grade: 11,12; **Prerequisites:** Concurrent enrollment in Calculus or higher; Grade of "B" or higher in Algebra II and Completion of Calculus or Honors/AP B Physics or Teacher Approval; **Term:** Year; **Credit:** 1.

SCI 250**Astronomy**

This course is only offered in the spring semester
Astronomy is a lab and project-based exploration of the cosmos. We will look at our place in the universe and study the sun, moon, asteroids, rocketry, planets and their moons, galaxies, stars, and black holes. We will also learn how astronomers know what they know. This is a non-mathematical approach that will look at the misconceptions we often have about the universe around us, and figure out what the correct concepts are. Students will build and launch their own rockets, and are expected to participate in two of the four scheduled night labs to learn the major constellations in the night sky. Projects include presentations on constellations and recent NASA explorations. *This elective course will count toward the science credits needed for graduation, but check with your Academic and College Counselor before substituting one of these courses for a traditional college preparatory class.*

Grade: 10,11,12; **Prerequisites:** None; **Term:** Semester; **Credit:** 0.5

SCI 330**Forensic Science**

Forensic Science is a one semester course dedicated to the methodical gathering and analysis of evidence to establish facts that can be presented in a legal proceeding. Topics include crime scene analysis, trace evidence, fingerprints, ballistics, DNA analysis, death and decomposition, injuries, blood analysis, analysis of bones and other remains, and odontology. The course will finish with a crime scene reconstruction. An optional trip to a morgue will also be planned.

Grade: 10,11,12; **Prerequisites:** Grade of "B" or higher Biology or Chemistry; **Term:** Semester; **Credit:** 0.5