

# Natural Science

## Requirements for Bachelor of Arts with Major in Natural Science

Concentration in Georgia Secondary School Broad Field Sciences  
 Concentration in Pre-engineering  
 (See individual sections for each listing)

## Requirements for Major in Natural Science with Georgia Secondary School Broad Field Science Certification (grades 6-12)

Students interested in secondary level certification should consult with the Chair of the Education Department and should also refer to the Education Department's section of this catalog.

### Core Requirements

BIB 111. Old Testament Introduction .....	3
BIB 142. New Testament Introduction .....	3
BIB 277-278. Christian Doctrine I, II .....	6
COR 100. The Christian Mind .....	2
COR 225-226. Cultural Heritage of the West I, II .....	6
COR 325. Global Trends for the Twenty-First Century .....	3
COR 337. Intercultural Experience .....	1
COR 340. Christ and Culture Seminar .....	1
ENG 111. English Composition .....	3
Must be completed during first year at Covenant. Exemption permitted with credit from AP language/composition.	
HIS 325. Twentieth-Century World History .....	3
PE 151. Concepts in PE .....	2
PE 152. Personal Aerobics .....	1
See the Core and Distribution Requirements section for descriptions of requirements and lists of courses.	
Fine Arts Distribution Requirement .....	3
Foreign Language .....	8
Proficiency in one year of an elementary-level foreign language. (Note: Students who have taken two years of the	

same foreign language in high school and attained an average grade of 2.67 or higher on a 4.0 scale are exempted from the foreign language requirement.)	
Humanities Distribution Requirement .....	3
Social Science Distribution Requirement .....	3
General education core subtotal .....	51

## Teaching Field

Choose one of the three following options:

### Biology Option

BIO 111-112. General Biology I, II .....	8
BIO 220-221. Human Anatomy and Physiology or BIO 320-321. Comparative Anatomy and Comparative Animal Physiology .....	8
BIO 242. Cellular and Molecular Biology, or BIO. 291. Biological Perspectives .....	3 or 4
BIO 360. Ecology .....	4
BIO 492. Senior Integration Paper .....	2
CHE 121-122. General Chemistry .....	8
Chemistry Electives .....	7
MAT 142. Precalculus Mathematics .....	4
NSC 108. Concepts of Geology .....	4
NSC 110. Problems of Physical Geography .....	3
NSC 112. Astronomy .....	4
Earth/Space Science Elective .....	4
Total Biology Option subtotal .....	59-60

### Chemistry Option

BIO 111-112. General Biology I, II .....	8
Biology Electives .....	7
CHE 121-122. General Chemistry I, II .....	8
CHE 225. Analytical Chemistry .....	4
CHE 323-324. Organic Chemistry I, II & CHE 423. Biochemistry .....	4
CHE 492. Senior Integration Paper .....	2
MAT 142. Precalculus Mathematics .....	4
NSC 108. Concepts of Geology .....	4
NSC 110. Problems of Physical Geography .....	3
NSC 112. Astronomy .....	4
Earth/Space Science Elective .....	4
Total Chemistry Option subtotal .....	60

### Physics Option

BIO 111-112. General Biology I, II .....	8
Biology Electives .....	7
CHE 121-122. General Chemistry I, II .....	8
Chemistry Electives .....	7
MAT 145-146. Calculus I, II .....	8
MAT 247. Calculus III .....	4
PHY 231-232. General Physics I, II .....	8
PHY 233. Optics and Modern Physics .....	4
PHY 351-352. Quantum Mechanics I, II .....	6
PHY 341. Electromagnetism I .....	3
PHY 492. Senior Integration Paper .....	2

Total Physics Option subtotal.....65

## Professional Education

EDU 121. Introduction to Teaching .....	3
EDU 215. Technology for Educators .....	3
EDU 222. Educational Psychology .....	3
EDU 234. Teaching in a Pluralistic Society .....	3
EDU 322. Nature and Needs of the Early Adolescent Learner.....	3
EDU 340. Curriculum and Methods in the Secondary School.....	4
EDU 361. Education of Exceptional Children .....	3
EDU 370. History and Philosophy of American Education 'W' .....	3
EDU 411. Educational Assessment.....	1
EDU 491. Student Teaching Seminar .....	1
EDU 497-498. Teaching Practicums I, II - Secondary 'S' ..	15
Professional Education subtotal.....	<u>42</u>
Total degree hours for Biology Option .....	152-153
Total degree hours for Chemistry Option .....	153
Total degree hours for Physics Option.....	158

(Total hours will vary depending on need to take mathematics prerequisites.)

Note: COR 337. Intercultural Experience may be taken for 0-3 credit hours. It is also possible to be exempt from taking foreign language and/or math based on high school grades or placement scores. If either of these adjustments occurs, one or more elective hours may need to be taken in order to earn a minimum of 126 hours required for graduation.

## Natural Science Courses

The courses below with LAB course code will satisfy the core natural science lab distribution requirement. These courses may not be applied to the majors in biology, chemistry or physics.

### **105. Physical Science**

An introduction to elementary principles in both chemistry and physics. Students will be taught to think about science from a Reformed, biblical perspective. Physical Science is recommended for elementary education majors. Prerequisites: MAT 122 or above with a "C" or better, or math placement level 3 or above, or a math placement level of 2 where the student is currently enrolled in a mathematics course higher than MAT 122. Three hours lecture. Two hours laboratory. Laboratory fee: \$15. Four hours. LAB

### **106. Issues in Contemporary Biology**

An examination of major topics in contemporary biology that raise issues of particular concern for Christians in the early 21<sup>st</sup> century. Topics covered may include: the role and status of contemporary science in the modern, postmodern and Christian perspective; the revolution in molecular genetics and its implications for technology and human self understanding; origins issues including evolutionary theories, creation and intelligent design perspectives; and human nature issues including sociobiology and related evolutionary explanations for human behavior, morality and religion. Laboratory sessions will focus on understanding science as a human endeavor, taxonomy topics, exercises in genetic engineering and examination of evolutionary theory. Three hours lecture, Three hours laboratory. Laboratory fee: \$30. Four hours. LAB

### **107. Concepts in Human Heredity**

An introduction to key concepts in human genetics, with emphasis on the molecular mechanisms of information flow in cells, the impact of genes on phenotype, human genetic disease and population genetics. A long-term quantitative analysis of inheritance patterns in fruit flies, and molecular analysis of human genes are included as major components of the course laboratory. Three hours lecture. Three hours laboratory. Laboratory fee: \$30. Four hours. LAB

### **108. Concepts of Geology**

An examination of the history of uniformitarianism and its impact on modern geology with an analysis of its consistency in relation to the scientific method. Alternative theories of the development of landforms will be considered. Laboratory will include work with geological specimens. Three hours lecture. Two hours laboratory. Laboratory fee: \$15. Four hours. LAB

### **110. Concepts of Physical Geography**

This course is a study of factors affecting the environment with special attention to humankind's responsible stewardship of the natural creation. The course includes a study of the chemistry and physics of the atmosphere, including weather phenomena, and the chemistry and physics of internal and surface characteristics of landforms. Weathering and erosion are discussed in relation to climatology. Special emphasis will be placed on pollution problems of land, water and the atmosphere. Three hours lecture. One hour laboratory. Laboratory fee: \$15. Four hours. LAB

### **112. Astronomy**

A study of our understanding of the solar system from ancient times to the present, including findings of modern observational astronomy. Topics covered may include: the solar system, planets and their moons and rings, satellites, asteroids, comets, the galaxy, stellar theory, quasars, black holes and red shift. Prerequisite: MAT 111 or above, or math placement level 3 or above. Laboratory fee: \$15. Four hours. LAB

### **115. Science in Perspective**

A study of natural science in its historical and philosophical context, paying particular attention to the interplay between the practice of science, and religious and philosophical belief. The course will present a foundation for understanding science from a Christian perspective, and from this vantage point will trace the various philosophical traditions surrounding the growth of science from the Early Modern period to the present. A variety of topics in the physical and biological sciences will be used to illustrate the development of science, and in each case students will focus beyond the science itself to related philosophical and theological considerations. Topics to be discussed: forces and motion, gravity, light, special relativity, quantum theory and atomic structure, properties and molecules of living systems, levels of biological organization, molecular and cellular biology, macro/microevolution and intelligent design theory. Laboratory exercises for this course will attempt to illustrate the human aspects of scientific investigation and provide a foundation for judging the strength of scientific claims. Prerequisite: Sophomore standing or higher; MAT 122 or above, or math placement level 3 or above. Exceptions can be made with permission of the instructors. Laboratory fee: \$15. Four hours. LAB

### **170. Introduction to Engineering**

An introduction to the field of engineering. The course will discuss the similarities and differences between the major sub-disciplines of engineering (such as mechanical, electrical, and civil), as well as discuss the needed skills and

common tools of engineering. The issues of how Christians view technology will be discussed. One hour.

**492. Senior Integration Paper in Natural Science.**

See page 26. Two hours.