BIOLOGY CORE REQUIREMENTS:

BIOL 1124 General Biology II **4 hours**

The course will entail continued studies of the structure and function and plant and animal systems. Emphasis will be on the study of the classification and characterization of living organisms, plant structure and physiology, animal structure and physiology, ecological systems, and evolution in relation to a Christian worldview. This course includes classroom and laboratory instruction. Prerequisite: BIOL 1114.

BIOL 2544 Human Anatomy **4 hours**

This course is designed so that the student understands the development, histology and gross morphology of the human body. The course will use a lab/lecture format with extensive use of models, videos, and computer-assisted instruction as well as the dissection of a virtual cadaver utilizing high end educational software to achieve an understanding of human structure. The goal is to provide the student with the basic understanding of the human structure for use in further education or the student's professional career. Prerequisite: BIOL 1114 or permission of the instructor.

BIOL 2644 Human Physiology **4 hours**

This course is a study of the function of vertebrate organ systems in homeostasis. Topics include circulation, digestion, endocrine and nervous control, metabolism, muscle action and respiration, with emphasis on humans. It has three hours of lecture and one two-hour laboratory period each week. Prerequisite: BIOL 1114 or permission of the instructor.

BIOL 3033 Origins **3 hours**

This course is an introduction to the history of science as it relates to origins. The student will evaluate various theories of the beginning of life on Earth and the universe from a Christian worldview. The course will combine a survey of the scientific literature regarding creation and evolution with a careful examination of Biblical scholarship. Prerequisite: BIOL 1114.

BIOL 3204 Cell Biology **4 hours**

This course is a study of the smallest unit of life, the cell. Emphasis will be placed on cell structure and function including cell specific processes such membrane function, reproduction, metabolism, and respiration. Prerequisites: BIOL 1114 and 1124 or permission of instructor.

BIOL 4333 Genetics **3 hours**

This course is an introduction to the foundational principles of heredity and variation in humans, plants and animals including molecular and classical genetics. Prerequisites: BIOL 1114 and 1124.

CHEM 1124 General Chemistry II **4 hours**

This course is a continuation of General Chemistry I (CHEM 1114). Selected topics include chemical bonding, an introduction to organic chemistry, intermolecular forces, physical properties of solutions, chemical equilibrium, acids and bases, and thermodynamics. It has 150 minutes of lecture and one 100 minutes laboratory period each week. Prerequisite: CHEM 1114.

CHEM 3214 Organic Chemistry I **4 hours**

Students in this course will learn the structure, reactions, and reaction mechanisms of alkanes, alkyl halides, alkenes, alkynes, alcohols, ethers, and epoxides. The course also includes the study of stereochemistry and aromatic compounds. This course includes classroom and laboratory instruction. Prerequisites: CHEM 1114 and 1124.

CHEM 3224 Organic Chemistry II **4 hours**

This course is a continuation of the first semester course with emphasis on aspects of spectroscopy and conjugated systems, ketones, aldehydes, amines, carboxylic acids and their derivatives, and enols. This course includes classroom and laboratory instruction. Prerequisite: CHEM 3214.

NATS 1314 Intro to Physics I **4 hours**

This is an introductory study of the principles of force, energy, fluids, thermodynamics, electricity, waves, and optics. This course is not intended for physical science or mathematics majors. It has three hours of lecture and one two-hour laboratory period each week. Prerequisite: 1000 level or above mathematics course.

NATS 1334 Intro to Physics II **4 hours**

This course is a continuation of Introduction to Physics I (NATS 1314) and will study electricity, magnetism, light and optics, special relativity, and introductory atomic and nuclear physics. This course includes classroom and laboratory instruction. Prerequisite: NATS 1314.

BIOLOGY ELECTIVES:

Choose 18 hours from the following:

BIOL 3244 Microbiology **4 hours**

This course will cover the fundamental principles of microbiology including the structure and function of microbial cells and their activities in nature. This course includes classroom and laboratory instruction. Experimental methods in microbiology will be the focus of the laboratory. Prerequisites: BIOL 1114 and 1124.

BIOL 3313 Immunology **3 hours**

Students in this course will be introduced to basic principles of immunobiology and immunochemistry. Human immunity will be emphasized to include the lymphatic system, innate and adaptive immune mechanisms, antigen and antibody structure and interactions, and the roles of the immune system in allergies, autoimmunity, and transplantation. Prerequisites: BIOL 1114 and 1124.

BIOL 3343 Pharmacology **3 hours**

This course will study the chemical and pharmacological properties of the major classes of drugs. Pharmacokinetics and pharmacodynamics will be discussed for both licit and illicit pharmaceuticals including structure-activity relationships, mechanisms of action, and toxicity. Prerequisites: BIOL 1114 and 1124.

BIOL 3514 Botany **4 hours**

The focus of this class is the anatomy and physiology of the plant kingdom with an emphasis on photosynthesis, water and nutrient transport and use, and growth/development. Students gain practical experience in the laboratory using microscopic and macroscopic observations along with plant physiology experiments. Prerequisites: BIOL 1114 and 1124.

BIOL 3544 General Zoology **4 hours**

This course teaches students the basic principles of animal biology including surveys of morphology, physiology, genetics, and development. Classification, structure, and function of both invertebrates and vertebrates are examined in the laboratory. The course will examine zoology from evolution and creation perspectives. Prerequisites: BIOL 1114 and 1124.

BIOL 3574 Ecology **4 hours**

Students will analyze and learn the basics of ecology, studying the interactions of organisms with their environment. Studies will include examination of the ecosystems of plants and animals in lecture and laboratory settings. Prerequisites: BIOL 1114 and 1124.

BIOL 4114 Molecular Biology **4 hours**

This course is a study of molecular biology and genetics with emphasis on the structure, function, and mechanisms of the molecules involved in replication, recombination, transcription, RNA processing, translation, and gene expression. This course includes classroom and laboratory instruction. Prerequisites: BIOL 4333 and CHEM 3214.

BIOL 4203 Neuroscience **3 hours**

This course is an introduction to the structure and function of the vertebrate nervous system, including the cellular basis of neuronal activities, the physiological bases of motor control, sensory systems, motivated behaviors, and higher mental processes. We will also introduce neuroanatomical, neurophysiological, and behavioral methodologies, which contribute to an understanding of brain-behavior relationships. Prerequisites: BIOL 1114, BIOL 1124, and BIOL 2644.

CHEM 4414 Biochemistry **4 hours**

This course is an in-depth examination of the structure and function of carbohydrates, lipids, proteins, and nucleic acids. Vitamins, hormones, and enzymes will also be studied with regard to their relationship to life and metabolic processes. This course includes classroom and laboratory instruction. Prerequisites: BIOL 1114, CHEM 3214, and CHEM 3224.

CHEM 4713 Intro to Forensic Toxicology **3 hours**

Students will learn fundamentals concepts of forensic toxicology with emphasis on three major areas: postmortem forensic toxicology, human performance toxicology and forensic urine drug testing. In addition, they will be introduced to various aspects of analytical methodology for the isolation and identification of drugs of forensic interest in biological materials. Interpretive concepts such as pharmacokinetics and pharmacodynamics will be discussed. Prerequisite: BIOL 3343.

NATS 3802 Natural Science Seminar **2 hours**

This seminar is designed as an intensive study of various topics or methodologies. A writing project is required. The course may be repeated with a change of subject matter for a maximum of four credit hours. Permission of Program Director is required.

NATS 4123 History of Science **3 hours**

This course is an introduction to the study of science in light of historical, philosophical, and cultural analysis. The course will analyze the evolution of science and technology. Focusing on the relationships between science, nature, and society, this class introduces some of the big questions about who we are, who we have been, and who we might become.

NATS 4513 Ethics in Science **3 hours**

The course will combine case-studies with experiential elements in an examination of professional and social responsibility, authorship and peer review, and current ethical dilemmas in a variety of scientific arenas. Prerequisite: PHIL 1113.

Other BIOL, CHEM, or NATS elective(s)

RESEARCH:

STAT 3003 Statistics **3 hours**

This is an introductory applied statistics course focusing on descriptive and inferential statistical methods. Topics include measures of central tendency and variability, the normal distribution, correlation, regression, and ANOVA. Prerequisite: MATH 1503, or 1513, or 1553 or permission of the instructor.

ENGL 3113 Writing and Research **3 hours**

This is an undergraduate course designed to develop sound techniques of research (experimental, historical, and descriptive survey) and writing in the student's major field. It also deals with selecting appropriate subjects, gathering and evaluating data, presenting material, and objectively reporting conclusions. Prerequisites: ENGL 1113 and ENGL 1213.

GRADUATION REQUIREMENT:

BIOL 4883 Biology Capstone **3 hours**

Students are to complete this course during their senior year. The student will develop a proposal for a research project to be completed prior to graduation. The proposal must be approved by the advisor as well as the Biology Department Chair. The project will demonstrate that the student has accomplished the degree objectives of the Bachelor of Science in Biology program. Prerequisite: Senior standing or permission of program director.