

Natural Sciences

Department Chair: Tara Giblin, Ph.D.

The program in the natural sciences is designed to bring together students with diverse backgrounds and provide them with a solid foundation and the skills essential for successful professional careers in the health and related sciences. This program is built upon a cross-discipline approach involving explorations and experimentation in biology, chemistry, mathematics and physics. It provides excellent preparation for women pursuing postgraduate training for medical and dental schools, veterinary schools, occupational and physical therapy programs, and graduate school. Our graduates also successfully enter the workforce as laboratory scientists.

The curriculum is designed to introduce students to various disciplines within the sciences by focusing on principles, methods of experimentation, and critical-thinking skills. Our curriculum engages students in collaborative and investigative activities with faculty to develop research and critical-thinking skills, and to learn principles and theories within scientific disciplines concurrently, by working on complex real-world problems. We foster higher-order thinking skills, leadership skills and intellectual maturity. Starting with their first year in the program, students may be engaged in conducting their own research projects, interpreting data and presenting their results. All students learn the most advanced computer techniques for presenting scientific information and the results of their research.

The culmination of the natural science experience is the completion of a senior project in the student's field of interest. The senior project is a synthesis of the student's four years at Stephens. Students are provided a problem in their field of interest, and they must provide an in-depth research paper to solve the problem and present their findings to their peers.

Another program feature is the internship. Students gain firsthand experience in a wide variety of areas including human and veterinary medicine, research in medicine, chemistry, behavior, commercial laboratory experiences, and government policy. Our internship program grants students a competitive advantage over others in their postgraduate careers. For many, these internships have created important postgraduate opportunities for jobs, graduate schools and professional schools. Internships are generally available locally at medical and veterinary hospitals and clinics, physical and occupational therapists, and midwives. Some students prefer to do internships in the summer close to home or at other nationally recognized institutions providing grants and funding for student research.

Academic partnerships include a three-year/two-year program with Washington University in St. Louis, MO in Occupational Therapy (OT) where a student earns a Bachelor of Arts degree from Stephens College and a Master's degree in Occupational Therapy from Washington University.

Two academic articulation agreements currently exist with Chatham College, PA. One is a three-year/two-year program in Physician Assistant Studies. The other is a Doctor of Physical Therapy Program in which a Stephens College student must graduate from Stephens College prior to entry.

Students are actively involved in collaborative research with faculty in the Department of Natural Sciences. The faculty maintains academic excellence by publishing papers (often with student co-authors), writing research grant proposals, attending professional meetings and soliciting seminars from outside professionals and colleagues. Facilities for research exist in chemistry, microbiology, and molecular biology. Additional research facilities include the Johnson Plant Science Laboratory/Greenhouse for botanical research and the Reis Biological Station in the Missouri Ozark Mountains for behavioral, ecological and environmental research.

Stephens College offers a Bachelor of Arts in Biology, and a Bachelor of Science in Biology. The Bachelor of Science in Biology is divided into two tracks for a student to choose from based on her career goals. The Health Sciences track serves as a Pre-veterinary and Pre-medical track, and will also prepare students for graduate study in Occupational Therapy, Physical Therapy or other health related fields. The Laboratory Science track places a greater emphasis on laboratory skills and prepares a student for Ph.D. programs in science as well as entry into the workforce after graduation.

Requirements for the B.S. Major in Biology

The Bachelor of Science major in biology requires completion of liberal arts requirements and of required courses, plus electives in the natural sciences (BIO, CHM, NSC, PHY). A grade of C- or better must be earned in required natural science courses (BIO, CHM, NSC, PHY) to graduate. All pre-professional studies (pre-med, pre-vet, pre-dental, etc.) are strongly advised to complete the chemistry sequence through organic chemistry (CHM432) even though it is not a requirement of the major. Students should select a math course that is consistent with their career goals. A student wishing to earn a B.S. degree in Biology and proceed to Chatham's Doctoral Program in Physical Therapy, must include CHS114, BIO343 and BIO349.

Health Science Track**Required Courses (54 hours):**

BIO 105: Basic Laboratory Techniques (2 hrs.)
BIO 181: Investigations of Biological Concepts I (4 hrs.)
BIO 182: Investigations of Biological Concepts II (4 hrs.)
BIO 290: Genetics (4 hrs.)
BIO 292: Cell Biology (3 hrs.)
BIO 311: Microbiology (5 hrs.)
BIO 343: Human Anatomy (5 hrs.)
BIO 349: Human Physiology (4 hrs.)
BIO 410: Biochemistry (3 hrs.)
BIO 497: Senior Project I (2 hrs.)
BIO 498: Senior Project II (2 hrs.)
CHM 111: General Chemistry I (4 hrs.)
CHM 112: General Chemistry II (4 hrs.)
PHY 211: Physics I (4 hrs.)
PHY 212: Physics II (4 hrs.)

Recommended Electives (0-7h)

BIO 201: Structural Kinesiology (3 hrs.)
BIO 284: Vertebrate Zoology (4 hrs.)
BIO 315: Immunology (3 hrs.)
BIO 377: Molecular Biology Techniques (2 hrs.)
CHM 341: Organic Chemistry I (4 hrs.)
CHM 342: Organic Chemistry II (4 hrs.)
CHM 345: Instrumentation (4 hrs.)

Laboratory Science Track**Required Courses (43 hours):**

BIO 105: Basic Laboratory Skills (2 hrs.)
BIO 181: Investigations of Biological Concepts I (4 hrs.)
BIO 182: Investigations of Biological Concepts II (4 hrs.)
BIO 292: Cell Biology (3 hrs.)
BIO 290: Genetics (4 hrs.)
BIO 311: Microbiology (5 hrs.)
CHM 345: Quantitative Instrumental Analysis (4 hrs.)
BIO 377: Molecular Biology Techniques (2 hrs.)
BIO 496: Internship (3 hrs.)
BIO 497: Senior Project I (2 hrs.)
BIO 498: Senior Project II (2 hrs.)
CHM 111: General Chemistry I (4 hrs.)
CHM 112: General Chemistry II (4 hrs.)

Recommended Electives (2-17 hours)

BIO 284: Vertebrate Zoology (4 hrs.)
BIO 315: Immunology (3 hrs.)
BIO 410: Biochemistry (3 hrs.)
CHM 341: Organic Chemistry I (4 hrs.)
CHM 342: Organic Chemistry II (4 hrs.)
BIO 343: Human Anatomy (5 hrs.)
BIO 349: Human Physiology (4 hrs.)
PHY 211: Physics I (4 hrs.)
PHY 212: Physics II (4 hrs.)

Requirements for the B.A. Major in Biology

The bachelor of arts major in biology requires completion of liberal arts requirements and a minimum of 50 semester hours in the major. A grade of C- or better must be earned in all required natural science courses (BIO,CHM,NSC,PHY) to graduate.

This major, Bachelor of Arts in Biology, may be modified to meet all the requirements for our agreements with Washington University Occupational Therapy program and for the Physicians Assistant Studies Program at Chatham College by following the course outline below.

Required Courses (32 hours)

BIO 181: Investigations in Biological Concepts I (4 hrs.)
BIO 182: Investigations in Biological Concepts II (4 hrs.)
BIO 496: Research/Clinical Internship (3 hrs.)
BIO 497: Senior Project I (2 hrs.)
BIO 498: Senior Project II (2 hrs.)
CHM 111: Gen College Chemistry I (4)
CHM 112: Gen College Chemistry II (4)
MAT 207: Statistics (3 hrs.)
PHY 211: Physics I (4 hrs.)

and ONE of the following four groups:

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- **BA four year Biology degree (Stephens College only) (17-19 semester hrs.)**
 - Six to eight hours of 200 level coursework (6-8)
 - Eleven hours of 300 level coursework (11)
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- **3:2 Masters in Physician Assistant Studies (Chatham College, PA) (27 semester hrs.)**
 - BIO 290: Genetics (3 hrs.)
 - BIO 311: Microbiology (5 hrs.)
 - BIO 343: Human Anatomy (5 hrs.)
 - BIO 349: Human Physiology (4 hrs.)
 - CHM 341: Organic Chemistry I (4 hrs.)
 - EDU 114: The Child: Life Span/Cross-Cultural Perspective (3 hrs.)
 - PSY 111: Introduction to Psychology (3 hrs.)
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- **3:2 Master in Occupational Therapy (Washington University, MO) (18 semester hrs.)**
 - BIO 343: Human Anatomy (5 hrs.)
 - BIO 349: Human Physiology (4 hrs.)
 - EDU 114: The Child: Life Span/Cross-Cultural Perspective (3 hrs.)
 - PSY 111: Introduction to Psychology (3 hrs.)
 - PSY 320: Abnormal Psychology (3 hrs.)

and must be able to show competency in the following:

 - CIS 206: Computer Information Systems
 - BIO 195: Medical Terminology
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- **Doctoral program in Physical Therapy (Chatham College, PA)**

To be eligible to enter this program your degree program must include:

 - EDU 114: The Child: Life Span/Cross-Cultural Perspective (3 hrs.)
 - BIO 343: Human Anatomy (5 hrs.)
 - BIO 349: Human Physiology (4 hrs.)
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Requirements for a Minor in Natural Sciences

A natural sciences minor requires completion of BIO 181 and at least 12 additional hours in the Natural Sciences (BIO, CHM, or PHY) with 6 hours at or above the 300 level.

Requirements for a Minor in Chemistry

A chemistry minor, for a biology major, requires the completion of CHM 341–CHM342 and at least two of the following electives: CHM 345, CHM 410/BIO 410, and CHM 496. This is in addition to the chemistry courses required within the biology major. For non-biology majors wishing to earn a chemistry minor, the minor requires completion of CHM111–112, CHM 341–342, plus one of the following electives: CHM 345 or CHM 410/BIO 410. A chemistry minor is strongly recommended for all students considering graduate school or professional programs.

Requirements for a Minor in Forensic Science

A forensic science minor requires completion of PSY 111 Introduction to Psychology plus six hours in Biology/Forensic Science and six hours in Psychology/Forensic Science. Six of those hours must be at or above the 300 level.

Biology Courses

BIO 105: Basic Laboratory Techniques

(2 hrs.)

This course is designed to introduce science majors and minors to basic laboratory techniques, instrumentation, and safety. Emphasis is placed on training students to be proficient in performing basic laboratory skills, troubleshooting problems and the use/limitations of equipment.

BIO 111: Biological Concepts (with lab)

(3 hrs.)

(Open to all students, Liberal Arts approved Natural Science; lab fee charged)

An introduction to the science of biology. The following biological topics may be addressed: biology as a science, the scientific method, basic biochemistry, organ systems, ecology and human biology. Laboratory exercises are designed to illustrate and clarify concepts presented in lecture. Includes scholarship by and about women and ethnic minorities. Does not count in the major.

BIO 115: Everyday Microbes

(3 hrs.)

(Open to all students, Liberal Arts approved Natural Science; lab fee charged)

This is a non-biology course designed to give students an overview of important topics in microbiology through understanding basic scientific principles. Common microbes, our relationship to them and our treatment of them will be covered.

BIO 121: The Art and Science of Growing Plants

(3 hrs.)

(Open to all students. Liberal Arts approved Natural Science. Lab fee charged.)

A lab oriented study of factors affecting plant growth and care. Equal time will be given to indoor and outdoor plants and the latter will include flower and vegetable gardens and landscape design. Topics covered include light requirements, pest control, organic gardening and the use of native plants. Does not count in the major.

BIO 181: Investigations in Biological Concepts I (with lab)

(4 hrs.)

(Lab fee charged)

This course integrates the ideas and disciplines of biochemistry, cell biology and genetics. Important topics include basic biochemistry, cell structure, metabolic activity, molecular genetics and Mendelian inheritance. Considerable emphasis is placed on the process of scientific investigation. The laboratory emphasizes proper lab technique, the process of science and investigation into cellular and genetic processes. Includes scholarship by and about women and ethnic minorities. Writing intensive. Offered Fall only.

BIO 182: Investigations in Biological Concepts II (with lab)

(4 hrs.)

(Prerequisite: BIO 111, BIO 181 or permission of instructor; lab fee charged)

A continuation of BIO 181. This course emphasizes the philosophy of science, evolution, diversity, systematics and

ecology. The course emphasizes the mechanisms of evolution, evolutionary history, surveys of organismal diversity and adaptation, ecology, and the relationship between ecology and evolution. Offered Spring only.

BIO 200: Introduction to Crime Scene Analysis

(3 hrs.)

(Open to all students, Liberal Arts approved Natural Science; lab fee charged)

(Prerequisite: Open to all students with 2 years of high school science)

The course will introduce a number of specialized fields in forensic science. Through the analysis of hair, fluid samples, DNA evidence, drugs and alcohol, we will learn basic principles of biology and chemistry and how they can be applied to solve crimes. Does not count in major. Offered annually.

BIO 201: Structural Kinesiology

(3 hrs.)

(Prerequisite: none)

This course will study human structure and function associated with body movement, with special emphasis on movements associated with dance training. The course will include a structural study of the bones, muscles, tendons and ligaments of the human body and a functional study of the resulting body movements. The course will also briefly examine other systems important in muscle movement, such as the cardiovascular and respiratory systems. Finally, this course will apply this knowledge of muscular function to performance and injury when training (using dance training as the model system). Offered periodically.

BIO 280: Topics in Biology

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

BIO 284: Vertebrate Zoology (with lab)

(4 hrs.)

(Prerequisite: BIO 182 or permission of instructor; lab fee charged)

A survey of the anatomy, physiology, zoogeography, evolution and ecology of vertebrate animals. In a mixed laboratory, discussion, and presentation format, students will investigate the major evolutionary changes that have occurred in fish, amphibians, reptiles, birds and mammals. Offered periodically.

BIO 290: Genetics (with lab)

(4 hrs.)

(Prerequisite: BIO 182 or permission of instructor; lab fee charged)

An examination of the transmission, structure and function of genetic material in plants and animals. Course content progresses from classical Mendelian genetics, including the chromosome theory of inheritance, structure and replication, organization and regulation of genetic information of bacterial, eukaryotic and viral genes, to current topics and techniques in molecular biology. Writing intensive. Offered Fall only.

BIO 292: Cell Biology

(3 hrs.)

(Prerequisite: BIO 182 or permission of instructor)

A study of the cell as the unit of structure and function of living things. The molecular, metabolic and ultrastructural systems emphasized together with bioenergetics, communication, heredity and gene expression. Offered biannually.

BIO 302: Forensic Microscopy

(3 hrs.)

(Prerequisite: BIO 181 or BIO 111 or BIO 200; lab fee charged. Cross listed as FOR 302.)

This course is designed to use various microscopic techniques to examine trace evidence. The focus will be on how to use a microscope for forensic science and the examination of various mounting and staining techniques of trace evidence. The trace evidence examined will include human and animal hairs, various fibers and plastic fusion, glass, paint, soil, explosives, minerals, dust, drugs and arson. In addition, students will learn the criteria for including or excluding trace evidence, and the preparation of evidence. This class is lab intensive and will use case studies using various techniques.

BIO 311: Microbiology (with lab)

(5 hrs.)

(Prerequisites: BIO 182, BIO 292, or permission of instructor; lab fee charged)

The study of the morphology, physiology, genetics and ecology of important microorganisms of human health and disease, and of environmental concern. Emphasis on bacteria and viruses. Writing intensive. Offered biannually.

BIO 315: Immunology

(3 hrs.)

(Prerequisite: BIO 311 or permission of instructor; lab fee charged)

An advanced introductory course in a rapidly advancing field, using experimental design as a tool to elucidate immunological principles. Includes (1) an introduction to the cells and tissues of the immune system; (2) the molecular mechanisms used by the immune system to recognize antigens and the process of activation of the immune system that results from antigen recognition; (3) a description of the means by which the stimulated immune system eliminates foreign molecules, cells and organisms; and (4) an examination of clinical problems that are primarily immunologic. This course contains several laboratory experiences. Writing intensive. Offered periodically.

BIO 343: Human Anatomy (with lab)

(5 hrs.)

(Prerequisite: BIO 182 or permission of instructor; lab fee charged)

An advanced course in anatomy. Examines the organization of the human body, human embryology, gross and microscopic anatomy of tissues and organ systems and pathology, diseases and developmental abnormalities of the human body. Instruction includes the use of prepared slides, actual mammalian dissections and computer-based human dissection. Offered biannually.

BIO 349: Human Physiology (with lab)

(4 hrs.)

(Prerequisite: BIO 182 or permission of instructor; lab fee charged)

An advanced course in human physiology. Examines the function of the human body, including basic cellular processes, regulation and homeostasis of the body, control of body movement, cardiovascular and respiratory physiology, metabolism, reproduction, development, aging and pathology. Instruction will include laboratory experiments and computer-based simulations. Offered biannually.

BIO 370: Evolutionary Biology

(3 hrs.)

(Prerequisite: BIO 290 or BIO 182 with permission of instructor)

Evolutionary biology will emphasize the following topics: the synthesis of evolutionary theory and genetics, population genetics, molecular evolution, mechanisms of evolution, speciation, phylogeny reconstruction and evolutionary history.

BIO 377: Molecular Biology Techniques

(2 hrs.)

(Prerequisite: BIO 292 or permission of instructor)

This course will focus on examination of current molecular biology research techniques. The class will be laboratory based and writing intensive. Special emphasis will be placed on methodology and application of specific molecular techniques and essays commonly used in research and clinical environments. Additionally, this course will serve to develop critical analysis skills of current research and provide opportunity to expand in scientific writing, presentation and discussion. Writing intensive. Offered biannually.

BIO 380 Topics in Biology

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

BIO 410: Biochemistry

(3 hrs.)

(Prerequisite: BIO 182, CHM 341; cross listed as CHM 410)

This course blends complex biological and chemical concepts. Advanced problem-solving skills are used to investigate amino acids/proteins, enzymes, protein purification, nucleic acids, flow of genetic information, analysis and cloning of genes, membranes, carbohydrates, and metabolic pathways. Offered periodically.

BIO 496: Research/Clinical Internship

(3 hrs.)

(Prerequisite: permission of instructor)

Provides opportunities for select junior and senior science majors to participate in a research program in biology under the supervision of a full-time professional scientific investigator in industry or shadow professionals in the student's chosen occupational field. Interns become familiar with all aspects of the research project, including the design, carrying out the research plan and analyzing and reporting the research results. Interns have opportunities to present papers at the Missouri Academy of Science and the Tri-Beta Biological Society meetings. Graded on Pass/Fail basis.

BIO 497: Senior Project I/BIO 498: Senior Project II

(2 hrs. per semester)

(Prerequisite: senior standing or permission of instructor)

This two semester course sequence assesses the ability of graduating students to assimilate diverse biological information into a meaningful synthesis. Course projects will be tailored to the interests and training of the student. During the first semester, students learn experimental design and data analysis strategies. During the second semester, students work independently during the semester to develop written and oral syntheses of scientific literature to be presented in an open seminar at the end of the semester. Writing intensive.

Chemistry Courses

CHM 101: Chemistry in Everyday Life

(3 hrs.)

(Open to all students, Liberal Arts approved Natural Science; lab fee charged)

This one-semester course, designed for non-science majors, will provide a broad view of the way in which chemistry affects people in their daily lives. Ordinarily, it will be taken by students who wish to meet the science requirement for graduation, and by students wishing to broaden their general scientific knowledge and understanding of the world around them. The course is appropriate for students who have had no chemistry in high school, or one year of chemistry. Students who have had more than one year of high school chemistry should not enroll.

CHM 111: General College Chemistry I (with lab)

(4 hrs.)

(Prerequisite: two years of high school algebra or concurrent enrollment in MAT 111: College Algebra; approved eye protection required; lab fee charged)

First semester of the sequence covering the fundamental principles of chemistry. Topics include matter, chemical compounds and reactions, stoichiometry, thermodynamics, atomic structure, bonding and molecular geometry. Also emphasized are the accomplishments and contributions of women within the chemical sciences. The laboratory introduces students to basic skills and techniques.

CHM 112: General College Chemistry II (with lab)

(4 hrs.)

(Prerequisite: CHM 111; approved eye protection required; lab fee charged)

Second semester of the sequence covering the fundamental principles of chemistry. Topics include chemical kinetics and equilibrium, properties of gases, liquids, solids and solutions, acid-base chemistry, electrochemistry and nuclear chemistry.

CHM 280: Topics in Chemistry

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

CHM 340: Introduction to Organic Chemistry (with lab)

(5 hrs.)

(Prerequisites: grade of C or better in CHM 111 or equivalent of instructor's consent; lab fee charged)

A survey of organic chemistry, including an introduction to structure and bonding, functional group chemistry, principles of reactivity, reaction mechanisms, the molecules of life. Laboratory illustrates and augments the lecture material. 4 lectures, 1 lab per week.

CHM 341: Organic Chemistry I (with lab)

(4 hrs.)

(Prerequisite: CHM 112; approved eye protection required; lab fee charged)

First semester of the sequence covering the chemistry of carbon-containing compounds. Topics include orbitals and bonding, the nomenclature and physical properties of functional groups, conformations and stereochemistry, substitution and elimination reactions at sp³-hybridized carbon, additional reactions to carbon-carbon multiple bonds and spectroscopy. The laboratory introduces basic skills and techniques.

CHM 342: Organic Chemistry II (with lab)

(4 hrs.)

(Prerequisite: CHM 341; approved eye protection required; lab fee charged)

Second semester of the sequence covering the chemistry of carbon-containing compounds. Topics include spectroscopy, addition and substitution reactions at the carbonyl group, enolates, aromatic compounds, radicals and pericyclic

reactions. Studies in biochemical compounds such as amino acids, peptides and proteins may be included. Laboratory will focus on the investigations of important organic reactions.

CHM 345: Quantitative Instrumental Analysis

(4 hrs.)

(Prerequisite: CHM112; lab fee charged)

This quantitative analysis courses the principles of instrumental analysis. Instruments such as gas chromatograph (GC), ultraviolet/visible spectrometer (UV/Vis) fourier transform spectrometer (FTIR) and high performance liquid chromatograph (HPLC) will be utilized. The complimentary laboratory experience allows hands-on experience conducting quantitative analysis. Students will learn calibration techniques and method development. The laboratory will also include an individualized research component. Offered periodically.

CHM 380: Advanced Topics in Chemistry

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

CHM 410: Biochemistry

(3 hrs.)

(Prerequisites: BIO 182, CHM 341. Cross- listed as BIO 410)

This course blends complex biological and chemical concepts. Advanced problem-solving skills are used to investigate amino acids/proteins, enzymes, protein purification, nucleic acids, flow of genetic information, analysis and cloning of genes, membranes, carbohydrates and metabolic pathways. Offered periodically.

CHM 496: Research Internship

(3 hrs.)

(Prerequisite: permission of instructor)

Select junior and senior science majors are able to participate in a research project in chemistry under the supervision of a professional scientific investigator. Interns become familiar with all aspects of the research process, including project design, planning, experimentation, analysis and presentation. Opportunities to present data and results at meetings of professional societies, such as the American Chemical Society, are available.

Forensic Science Courses**FOR 302: Forensic Microscopy**

(3 hrs)

(Prerequisite: BIO 181 or BIO 111 or BIO 200; cross listed as BIO 302. Lab fee charged)

This course is designed to use various microscopic techniques to examine trace evidence. The focus will be on how to use a microscope for forensic science and the examination of various mounting and staining techniques of trace evidence. The trace evidence examined will include human and animal hairs, various fibers and plastic fusion, glass, paint, soil, explosives, minerals, dust, drugs and arson. In addition, students will learn the criteria for including or excluding trace evidence, and the preparation of evidence. This class is lab intensive and will use case studies using various techniques.

FOR 330: Introduction to Forensic Psychology

(3 hrs.)

(Prerequisite: PSY 111; cross-listed with PSY 330.)

This course is intended for students interested in the interactive relationship between psychology and law. The student will explore the many aspects of criminal and civil law and how psychological research, theory, and practice assist the legal system and influence public policy.

FOR 380: Topics in Forensic Science

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

Natural Sciences Courses

NSC 115: Physical Science for Elementary Teachers

(3 hrs.)

(Open to all students; Liberal Arts approved Natural Science; lab fee charged)

Liberal arts class for non-science majors and education majors. A comprehensive, hands on laboratory science course on experiments in Life Science, physical science, earth science as well as basic content in all three areas.

NSC 125: Science of Beauty

(3 hrs.)

(Open to all students; Liberal Arts approved Natural Science; lab fee charged)

Liberal arts class for non-science majors. An introduction to the human body from the cell to whole organ systems. The course emphasizes the use of the scientific method, examines the perception of beauty and questions whether there is a scientific basis for beauty. The biological and chemical basis behind cosmetics and cosmetic surgical procedures are explored. Does not count in the major.

NSC 211: Environmental Science

(3 hrs.)

(Open to all students, Liberal Arts approved Natural Science; lab fee charged)

Students will look at many aspects of environmental issues such as the economic, cultural, historical and most important, the scientific basis. Study how the living and nonliving parts of an ecosystem work and interact to affect the environment or ecosystem. Study human influences on the environment from local to global scales. Understanding the scientific approach to evaluate environmental issues.

NSC 280: Topics in Natural Science

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

NSC 333: Practicum (with lab)

(1-3 hrs.)

(May be repeated for credit)

(Prerequisites: BIO 182 and permission of instructor; junior and senior standing preferred)

Practical work experiences related directly to courses and/or program operations in the natural sciences, supervised by an instructor of the student's choice.

NSC 365: Women, Science and Society

(3 hrs.)

(Prerequisite: junior or senior standing or permission of instructor; cross-listed as WST 365)

This course will broaden the student's understanding of the far-reaching impact that feminist analysis has had on all fields of knowledge, including the field of science. Students will learn that contemporary women in science are changing the way people think about science and practice it. Students in the course will benefit from exposure to cross-cultural analysis of science and some of the ways people from various cultures understand the human relationship to the world.

NSC 380: Advanced Topics in Natural Science

(3 hrs.)

Topics courses are devoted to special subjects that may not be covered in depth in other courses.

Physics Courses

PHY 211: College Physics I (with lab)

(4 hrs.)

(Prerequisite: MAT 111 or MAT 211 or the equivalent, or permission of instructor; lab fee charged)

Topics include statics, kinematics, dynamics, oscillations, work, energy, gravitation, thermodynamics and sound. Includes scholarship by and about women and ethnic minorities.

PHY 212: College Physics II (with lab)

(4 hrs.)

(Prerequisite: PHY 211 or permission of instructor; lab fee charged)

Continuation of PHY 211. Includes electricity and magnetism, optics, matter, waves and particles.