Biology

Purpose and Goals

The curricula of the Department of Biology are designed to provide students with a wealth of biological knowledge. The department prepares students for careers as biologists and biology educators. The department also provides the undergraduate foundation for students who plan to pursue professional studies leading to the Doctorate in Medicine, Dentistry, Veterinary medicine, Optometry, Pharmacy, Allied Health and other graduate study.

Academic Standards

Students must earn a minimum grade of a “C” in all classes taken in their major disciplines and a minimum grade of a “C” in all classes taken in their minor disciplines (if applicable).

Special Emphasis Options

In addition to the degree programs listed above, students may select alternate required courses in the major in such a way as to pursue specific career options. Emphasis options are available in Biology teacher preparation, Pre-Medicine, Pre-Dentistry, Pre-Veterinary, Pre-Podiatry, Pre-Pharmacy, Pre-Physical therapy, or other Allied health professions. Please refer to course listings on the following pages.

Bachelor of Science in Biology Degree Program Requirements

<table>
<thead>
<tr>
<th>Core Curriculum</th>
<th>42</th>
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</thead>
<tbody>
<tr>
<td>Foreign Language Requirements (one language)</td>
<td>6</td>
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<table>
<thead>
<tr>
<th>Major Requirements</th>
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<tbody>
<tr>
<td>BIOL 1015 General Biology</td>
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<tr>
<td>BIOL 1021 Biology Seminar</td>
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<tr>
<td>BIOL 1025 General Biology</td>
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<td>BIOL 1031 Biology Seminar</td>
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<td>BIOL 1034 Botany</td>
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<td>BIOL 2054 Genetics</td>
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<tr>
<td>BIOL 3014 Human Physiology and Anatomy</td>
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<tr>
<td>BIOL 3024 Human Physiology and Anatomy</td>
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<tr>
<td>BIOL 3034 General Microbiology</td>
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<tr>
<td>BIOL 3073 Molecular Biology I</td>
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<table>
<thead>
<tr>
<th>Major Electives</th>
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<tbody>
<tr>
<td>BIOL 3044 Immunology</td>
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<tr>
<td>BIOL 3054 Gross Anatomy</td>
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<tr>
<td>BIOL 3064 Animal Histology</td>
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<tr>
<td>BIOL 3083 Molecular Biology II</td>
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<tr>
<td>BIOL 3124 Cell Biology</td>
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<td>BIOL 4012 Med Terminology</td>
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<td>BIOL 4013 Topics in Genomics</td>
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<tr>
<td>BIOL 4014 Vertebrate Embryology</td>
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<tr>
<td>BIOL 4024 Comparative Anatomy</td>
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<td>BIOL 4034 Practicum in Biology</td>
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<td>BIOL 4051 Research</td>
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<td>BIOL 4061 Research</td>
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<tr>
<td>CHEM 1032 General Inorganic Chemistry Laboratory I</td>
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<td>CHEM 1033 General Inorganic Chemistry</td>
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<tr>
<td>CHEM 1042 General Inorganic Chemistry Laboratory</td>
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<td>CHEM 1043 General Inorganic Chemistry</td>
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<td>CHEM 2032 General Organic Chemistry Laboratory I</td>
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<td>CHEM 2033 General Organic Chemistry I</td>
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</tr>
<tr>
<td>CHEM 2042 General Organic Chemistry Laboratory II</td>
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</table>
CHEM 2043  General Organic Chemistry II  3
Biology majors are required to take four, one (1) hour credit (HUPF/KINE (1011 - 2151)) physical activity courses.  4
Total Hours  122

Requirements for Biology as a Minor Field

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td>BIOL 1015</td>
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<td>General Biology</td>
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<tr>
<td>BIOL 2054</td>
<td>Genetics</td>
<td>4</td>
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<tr>
<td>BIOL 3014</td>
<td>Human Physiology and Anatomy</td>
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<tr>
<td>BIOL 3024</td>
<td>Human Physiology and Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 3034</td>
<td>General Microbiology</td>
<td>4</td>
</tr>
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Total Hours  26

1. Biology majors are required to take MATH 1124 or higher. Students may need to take Algebra or Pre-calculus before enrolling in Calculus. Other students may be prepared to start with Calculus I or higher math.
2. Electives in 15 SCH of upper division (advanced) Biology courses. Elect from BIOL 3044, BIOL 3054, BIOL 3064, BIOL 3083, BIOL 3124, BIOL 4012, BIOL 4013, BIOL 4024, BIOL 4034, BIOL 4051 and BIOL 4061. A total of forty-eight (48) Biology SCH are required.
3. Biology majors may elect the minor of their choice and satisfy the catalog requirements for that minor. However biology majors only need to complete CHEM 4033 and CHEM 4042, Biochemistry lecture and lab, to complete the catalog requirements for a minor in chemistry.

Special Emphasis Programs

The following electives should be selected to prepare for the specialized fields listed.

Pre-medicine and Pre-dentistry

The minimum requirements for admission to medical or dental school include average scores on the Medical School Admission Test (MCAT) or Dental Aptitude Test (DAT) and the satisfactory completion of 90 semester hours of the pre-medical or pre-dental curriculum with average or better grades.

Candidates for admission are evaluated on the basis of their academic background, ability to succeed in professional school, integrity, psychological stability, motivation, judgment, and resourcefulness. The admissions committee will also evaluate the recommendations of the premedical advisory committee.

Students must apply to medical or dental school by June 1, one year in advance of their expected entrance. They are therefore advised to take the MCAT or DAT by the spring of their junior year.

MCAT Registration

Association of American Medical Colleges

Mcat@aamc.org or www.aamc.org/mcat (http://www.aamc.org/mcat)

DAT Registration

Association of American Dental Schools

<table>
<thead>
<tr>
<th>MCAT Registration</th>
<th>DAT Registration</th>
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<tbody>
<tr>
<td>American College</td>
<td>Testing Program Div. of Educational Measurements</td>
</tr>
<tr>
<td>P.O. Box #414</td>
<td>Council on Dental Education</td>
</tr>
<tr>
<td>Iowa City, IA 52240</td>
<td>American Dental Association</td>
</tr>
<tr>
<td>(319) 337-1305</td>
<td>211 East Chicago Avenue</td>
</tr>
<tr>
<td></td>
<td>Chicago, IL 60611</td>
</tr>
<tr>
<td></td>
<td>(312) 440-2689</td>
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</tbody>
</table>

The Pre-Professional curriculum qualifies students to apply to schools of Medicine, Dentistry, Pharmacy, Podiatry, Optometry, and Graduate studies. The curriculum enables students to complete the MCAT, DAT, PCAT, OAT and GRE preparatory course by the spring of their junior year. Students are encouraged to attend at least one summer session to ensure completion of necessary courses prior to the summer of their junior year.
Dental School Early Admission Programs

The University of Texas Dental School at San Antonio, Baylor College of Dentistry in Dallas, The University of Texas Dental Branch at Houston and the University of Iowa Dental School in Iowa City, Iowa have established early admission agreements with Prairie View A&M University. Students may apply for early admission to these schools after completing the first year of the biology curriculum for majors with a 3.0 or higher GPA.

Applications may be obtained from the Pre-Dental advisor (Dr. Cleveland O. Lane, Jr.). The application deadline is October 1 of the student's sophomore year. The dental schools will evaluate each application and make the selections of students for interviews.

The dental schools will also award early admission to a limited number of the qualified applicants. The admitted students will participate in pre-matriculation programs at the dental schools in the summers of their sophomore and junior years. In the senior year, the admitted students will have dual enrollment at Prairie View A&M University and the Dental School. However, the students will take first year dental school courses which will satisfy the biology B.S. degree requirements for the senior year of the special curriculum.

Pre-Veterinary Medicine

The Pre-veterinary medicine curriculum provides the prerequisites for admission to professional veterinary medicine schools. The curriculum also leads to a Bachelor of Science degree in biology. Students in the Pre-veterinary medicine program should apply to veterinary medical school at the beginning of their third year. Students should write to the Office of Admissions of the desired institution for information about specific admission requirements.

Most schools of veterinary medicine require the Graduate Record Examination (GRE), Veterinary Admission Test (VAT), or Medical College Admission Test (MCAT). It is the students’ responsibility to determine which of these examinations is required by the institution to which they are seeking admission.

Requirements in Addition to Biology Degree Requirements

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Chemistry</th>
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<tbody>
<tr>
<td><strong>Mathematics</strong></td>
<td><strong>Biochemistry</strong></td>
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<tr>
<td>MATH 3003</td>
<td>CHEM 4033</td>
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<tr>
<td>Mathematics in Elementary Schools</td>
<td>Biochemistry</td>
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<td>3</td>
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<tr>
<td>CHEM 4042</td>
<td>CHEM 4042</td>
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<tr>
<td>Biochemistry Laboratory</td>
<td>Biochemistry Laboratory</td>
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<tr>
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<tr>
<td><strong>Total Hours</strong></td>
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<td>8</td>
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</table>

Pre-Veterinary medical students should contact the Pre-Veterinary faculty adviser in the Department of Biology.

Biology Teacher Preparation

Biology majors who plan to teach should follow the biology curriculum and the Teacher Certification Program in order to be eligible for certification as a teacher of biology, grades 7-12.

Student teaching is required of all students preparing to teach. Program prerequisites for student teaching should be completed before applying for student teaching. Additional information and the suggested curriculum for the Bachelor of Science degree with a Teacher Education option may be obtained from the biology teacher education faculty advisor, Dr. Cleveland O. Lane, Jr. in the biology department.

Honor Societies and Clubs

Betα Beta Beta Biological Honor Society stimulates sound scholarship, promotes the dissemination of scientific knowledge, and encourages investigation in the life sciences. To be eligible for selection, candidates must have a superior scholarship record and have completed at least two courses in biology totaling not less than 10 semester hours, or the equivalent of that number. They must also have completed at least one term of the second year of a four-year curriculum or its equivalent and exemplify high ethical and moral ideals.

Beta Kappa Chi Honor Society encourages and advances scientific education through original investigation, dissemination of scientific knowledge, and stimulation of high scholarship in the pure and applied sciences. To be eligible for membership, students must be in the upper fifth of their university class and have completed at least 64 semester hours of university work. Candidates for membership in Beta Kappa Chi must have completed 17 semester hours in one of the sciences recognized by the society with a grade average of at least B.

Minority Association of Pre-health Students provides activities through partnerships with near-by chapters of Student National Medical Association (SNMA) to achieve the goal of increasing the matriculation of undergraduate students into professional health related programs by providing information, materials and mentorship opportunities. The Premedical Club exists to establish a rapport between the biology department and medical schools; to establish a better relationship between premedical students and the staff of professional schools; to provide opportunities for students to visit various health professional schools for tours, chats, and informal lectures; to assist students in becoming competent test takers and broaden their cultural perspective. The Premedical Club is open to all students interested in a medical career.

The Pre-Veterinary Medicine Club exists to establish a rapport between the Biology Department, Veterinarians and Colleges of Veterinary Medicine; to establish student veterinary preceptor ships to provide opportunities for visits to zoos and the College of Veterinary Medicine at Texas A&M University.
to become aware of the vast differences in entry requirements for the 27 colleges of Veterinary medicine and to assist students in becoming competent test takers. The club is open to all students interested in veterinary medicine.

The Pre-Dental Club exists to establish a rapport between the biology department and dental schools; to establish a better relationship between pre-dental students and dental school staff; to provide opportunities for students to visit dental schools; to assist students in becoming competent test takers and to strengthen skills of students interested in a dental career.

The Allied Health Club is designed to provide these students with an opportunity to acquire knowledge in reference to the allied health discipline. This club enables students interested in physical therapy, pharmacy, physician’s assistant, occupational therapy, optometry, dental hygiene, medical record administration, and public health an opportunity to learn about their chosen professions. These students are introduced to professionals in allied health; visit the campuses, and hospitals of the various programs; establish relationships with the faculty and other students interested in the allied health fields. The Allied Health Club is open to all students interested in a health professional career.

The Pre-Optometry Club is designed to educate and prepare students for careers in optometry. The Optometry Club provides opportunities for its members to visit optometry schools and attend seminars in reference to becoming adequately prepared for entry into optometry school. Seminars are given to assist the students in becoming competent test takers for the Optometry Admissions Test. The club is open to all students interested in optometry as a profession.

The Pre-Pharmacy Club is designed to educate and prepare students for careers in pharmacy. The Pharmacy Club invites pharmacists to speak to their club to inform them about the pharmaceutical sciences. The students visit pharmacy schools and gain knowledge in reference to successful matriculation in pharmacy school. The club assists students in becoming competent test takers for the Pharmacy College Admissions Test. The club is open to all students interested in pharmacy as a profession.

Courses

**BIOL 1015 General Biology: 5 semester hours.**
Basis of life, cell theory, structure and energy transformation, reproduction, and genetic variability. Origins of diversity of organisms.

**BIOL 1021 Biology Seminar: 1 semester hour.**
Discussion and presentations of current biological topics by students, faculty, and guest lecturers.

**BIOL 1025 General Biology: 5 semester hours.**

**BIOL 1031 Biology Seminar: 1 semester hour.**
Discussion and presentations of current biological topics by students, faculty, and guest lecturers.

**BIOL 1034 Botany: 4 semester hours.**
Morphology and physiology of flowering plants. Structure, method of reproduction, and biotic relationships of type representatives of lower plants.

**BIOL 1054 Anatomy and Physiology I: 4 semester hours.**
An introductory course examining the organization of a human body and the mechanisms for maintaining homeostasis. Topics include chemistry of life, cell and tissue structure, metabolism, skeleton, muscular, nervous, endocrine, and integumentary system. Designed for students who will pursue a career in nursing.

**BIOL 1064 Anatomy and Physiology II: 4 semester hours.**
An introductory course examining the organization of a human body and the mechanisms for maintaining homeostasis. Topics include metabolism, the cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive systems. Designed for students who will pursue a career in nursing.

**BIOL 1073 General Microbiology: 3 semester hours.**
Morphology and physiology of microorganisms related to health and sanitation; disinfection, growth, and control of those organisms causing common infectious diseases.

**BIOL 1111 College Biology Laboratory: 1 semester hour.**
Introductory laboratory course for non-biology majors. Emphasis on basic biological principles and their application to human life.

**BIOL 1113 College Biology I: 3 semester hours.**
Introductory course for non-biology majors. Emphasis on basic biological principles and their application to human life. Contemporary biology that covers the chemical basis of life, structure and function of the cell, molecular biology and genetics.

**BIOL 1123 College Biology II: 3 semester hours.**
A reflection of the interdependence of plants on animals and how man's existence is depending on successful interactions between plants and animals.

**BIOL 2054 Genetics: 4 semester hours.**
Analysis of the structure, function, and transmission of genetic materials.
Prerequisites: BIOL 1015 (http://catalog.pvamu.edu/search/?P=BIOL%201015) and BIOL 1025 (http://catalog.pvamu.edu/search/?P=BIOL%201025) and BIOL 1034 (http://catalog.pvamu.edu/search/?P=BIOL%201034).
BIOL 2063 Health Care Minor: 3 semester hours.
Introduction to the major health concerns that afflict minority and underserved communities. This course will examine the infectious diseases of special concern to public health and will identify and present for discussion. The course will examine current health policy and the availability of health services as modifiable influences on the health status of minority and underserved communities.

BIOL 3014 Human Physiology and Anatomy: 4 semester hours.
For biology and physical education majors. Human structure, physiology, organ systems, and related principles.
Prerequisites: BIOL 1015 and BIOL 1025.

BIOL 3024 Human Physiology and Anatomy: 4 semester hours.
For biology and physical education majors. Human structure, physiology, organ systems, and related principles.
Prerequisites: BIOL 1015 and BIOL 1025.

BIOL 3034 General Microbiology: 4 semester hours.
Morphology, physiology, classification, and cultivation of the microorganism relevant to agriculture, pre-medicine, and industry.
Prerequisites: CHEM 1033 and BIOL 1015.

BIOL 3044 Immunology: 4 semester hours.
Fundamental aspects of immunology, antigenic systems, hypersensitivity, and serology.
Prerequisites: BIOL 1015 and BIOL 1025.

BIOL 3054 Gross Anatomy: 4 semester hours.
Introduce the basic principles and facts relating to the gross anatomy of the human body.
Prerequisites: BIOL 1015 and BIOL 1025.

BIOL 3063 Human Dis Epi Mthds: 3 semester hours.
An introduction to the basic methodology of epidemiology study. This course will address statistical measures used frequently with epidemiological study designs and the description/analysis of data. The course will also include a discussion of the usefulness of epidemiologic study design in clinical and non-clinical settings.

BIOL 3064 Animal Histology: 4 semester hours.
Microscopic study of tissues and organs of vertebrates. Relation of structure to function.
Prerequisites: BIOL 1015 and BIOL 1025.

BIOL 3073 Molecular Biology I: 3 semester hours.
The dynamics of carbohydrate, fat, protein and nucleic acid metabolism; recombinant DNA evolution, gene structure and function in specialized eukaryotic systems.
Prerequisites: BIOL 1025 and CHEM 2043.

BIOL 3083 Molecular Biology II: 3 semester hours.
Regulation of gene function in bacterial cells; the functioning of eukaryotic chromosomes; the extraordinary diversity of eukaryotic viruses.
Prerequisites: BIOL 1025 and CHEM 2043.

BIOL 3124 Cell Biology: 4 semester hours.
A study of the ultrastructure and macro-molecular organization of cells, with emphasis on eukaryotic cells. The convergence of structure and function in life phenomena will be highlighted.
Prerequisites: BIOL 1025 and CHEM 2043.

BIOL 3134 Synthetic Biology: 4 semester hours.
The interdisciplinary study of the implementation and application of synthetic biology applied to design and construction of new biological parts, devices and systems.
Prerequisites: BIOL 1015 and BIOL 1025 and BIOL 2054 and BIOL 3073.

BIOL 4012 Med Terminology: 2 semester hours.
Emphasis is on understanding basic medical terms and learning how they are used in documenting and reporting patient care procedures. Practical applications are provided by exercises and medical record analyses in each chapter.

BIOL 4013 Topics in Genomics: 3 semester hours.
The study of the human genome in a holistic manner. Physical mapping and large scale DNA sequencing of the human genome: gene expression and micro arrays; the application of genome data to the incidence of disease markers and gene based therapeutics.
Prerequisites: BIOL 1015 and BIOL 1025 and BIOL 2054 and CHEM 2033 and CHEM 2043.

BIOL 4014 Vertebrate Embryology: 4 semester hours.
Structure, principles, and progress in vertebrate development. Chickens and pigs as principle laboratory materials.
Prerequisites: BIOL 1015 and BIOL 1025.
**Biology**

**BIOL 4024 Comparative Anatomy: 4 semester hours.**
Anatomy of organs and organ systems, their function and evolution in major vertebrate types. Prerequisites: BIOL 1015 (http://catalog.pvamu.edu/search/?P=BIOL%201015) and BIOL 1025 (http://catalog.pvamu.edu/search/?P=BIOL%201025).

**BIOL 4034 Practicum in Biology: 4 semester hours.**
Recent advances in biology. Emphasis placed on investigation and inquiry as a means of acquiring knowledge in biology.

**BIOL 4051 Research: 1 semester hour.**
Library and laboratory work in specific biological problems.

**BIOL 4061 Research: 1 semester hour.**
Library and laboratory work in specific biological problems.

**BIOL 5003 Research in Zoology: 3 semester hours.**
Selected individual research problems in any specified area in which the student has a sufficient background.

**BIOL 5013 Genomics: 3 semester hours.**
The study of the genomes on a holistic manner, thus providing information on the uses and shortcomings of genetic information. The application of genomic data to determine the incidences of disease; to identify disease markers and develop gene based therapeutics.

**BIOL 5024 Microscopic Anatomy: 4 semester hours.**
Microscopic study of tissues and organ of vertebrates; relation of structure to function.

**BIOL 5033 Physio Environ & Man: 3 semester hours.**
This course explores the absorption, metabolism and excretion of environmental agents, their mechanisms of action, and the processes of adaptation by the exposed organism from the sub-cellular level to that of the total organism.

**BIOL 5053 Air Pollutants: 3 semester hours.**
Introduction of essentials of the toxicology of major air contaminants, the factors governing air quality criteria and standards, and alternatives for air pollution abatement.

**BIOL 5063 Micro Activ Toxico: 3 semester hours.**
Survey of microbial actions in the field of environmental toxicology. Toxigenic microorganisms, major microbial toxins and use of microbial systems in toxicological studies. Microbial alterations of environmental contaminants.

**BIOL 5073 Selected Topics in Environmental Toxicology: 3 semester hours.**
In-depth treatments of several important areas in the field of environmental toxicology, including studies of microbiology of toxic substances, toxic substances in food, poisonous plants and venomous animals, occupational health and safety and chemical ecology.

**BIOL 5074 Genetics: 4 semester hours.**
Laws and principles governing heredity in plants and animals; plant and animal improvement through eugenics.

**BIOL 5094 General Microbiology: 4 semester hours.**
Morphology, physiology, classification, cultivation of micro-organisms and their relation to agriculture, pre-medicine, and industry.

**BIOL 5123 Cell Biology: 3 semester hours.**
An in-depth study of the morphological and functional aspects of the cell. Emphasis will be placed on the current understanding of cell structure and how this relates to physiological and biochemical processes.

**BIOL 5141 Seminar in Biological Problems: 1 semester hour.**
Student participation in general and specific research topics in Biology.

**BIOL 5143 Field and Animal Ecology: 3 semester hours.**
Composition, dynamics and distribution of biotic communities in various sections of the southwest. Outdoor camping and cooking.

**BIOL 5183 Experimental Genetics: 3 semester hours.**
Thorough experimentation to show how variations may be brought about; techniques of mating and breeding to support accepted principles.

**BIOL 5204 Biology for Teachers: 4 semester hours.**
Training course for prospective teachers of zoology and botany. Lectures or conferences, field and laboratory work.

**BIOL 5991 Independent Study: 1 semester hour.**
Reading, research and/or field work on selected topics in Biology. Prerequisite: consent of advisor. Students may register this course each semester. Only six credit hours may be earned.

**BIOL 5993 Independent Study: 3 semester hours.**
Reading, research and/or field work on selected topics in Biology. Prerequisite: consent of advisor. Students may register this course each semester. Only six credit hours may be earned.