

DEPARTMENT OF BIOLOGICAL SCIENCES

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Website: Department of Biological Sciences (<http://www.shsu.edu/academics/biological-sciences>)

Mission

The Department of Biological Sciences is dedicated to the pursuit and dissemination of knowledge and scientific discovery in the life sciences through innovative teaching and research programs. The department strives to instill in its students the philosophy of lifelong scholarship, producing scientifically literate members of society who have the knowledge to contribute and compete in a rapidly changing world.

Academic Programs

Biology, the study of living things, is an exciting and dynamic field that offers many areas of focus. Students may choose to study how life functions at the molecular, cellular, organismal, or ecological levels. The biological sciences provide opportunities to study viruses, bacteria, fungi, plants, and animals and to investigate the biochemical, physiological, morphological, anatomical, behavioral, ecological, and evolutionary processes that make each organism unique.

Highlights

The Department of Biological Sciences is located in the Lee Drain Building (http://www.shsu.edu/map/gmap_data/info.php?loc=53), which houses facilities including the following teaching laboratories:

- the Warner Herbarium
- Sam Houston State University Arthropod Collection
- Sam Houston State Vertebrate Museum and Texas Bird Sound Library
- an animal rearing facility
- greenhouse
- outdoor aviary

And the following research laboratories:

- scanning electron microscopy
- molecular biology
- microbiology
- morphology

The department operates the Center for Biological Field Studies, a 250 acre field station within 5 miles of campus that is dedicated to biological and environmental research and teaching.

Program Specific Requirements

Candidates for the Bachelor of Science (BS) in Biology or Biomedical Sciences or Bachelor of Arts (BA) in Biology are required to complete an Exit Exam in Biology to be eligible for graduation. The Department of Biological Sciences administers the Exit Exam once during the Spring semester at no cost to the student. A student is eligible to take the Exit Exam upon completion of all required biology credits or during the semester immediately prior to graduation (August graduates must take the examination during the Spring semester immediately prior to graduation). The exam score, although part of the student's record, has no effect on the student's GPA.

Curriculum

Major in Biology

The Bachelor of Arts or Bachelor of Science in Biology are ideal degrees for students interested in gaining a broad background in the biological sciences, while allowing flexibility to focus on a specific biology sub-discipline. All students majoring in biology will develop competence in the fundamental principles of biology and will gain experience in botany, zoology, cellular biology, microbiology, genetics, ecology and evolution. Students take an active role in creating a degree plan that best meets their interests and their career goals. Most students pursue careers in terrestrial ecology, animal physiology, animal behavior, medical professions, biotechnology, or teacher education. Students interested in forensic science combine an extensive background in biology with substantial coursework in chemistry and criminal justice to prepare them for work with state and federal agencies.

Required Courses for the Major

The biology major may choose from two degree programs, the Bachelor of Arts or Bachelor of Science. All majors must complete the following core courses:

Code	Title	Hours
Required Courses		
BIOL 1411	General Botany	4
BIOL 1413	General Zoology	4
BIOL 2440	Introductory Cell Biology	4
BIOL 3409	General Ecology	4
BIOL 3450	Introductory Genetics	4
BIOL 3470	General Microbiology	4
BIOL 4110	Undergraduate Seminar	1
BIOL 4111	Undergraduate Seminar	1
BIOL 4361	Introductory Evolutionary Bio	3
Total Hours		29

Students may choose their area of specialization contingent upon completion of the required core courses.

Major in Biomedical Sciences

The Biomedical Sciences degree offered by the Department of Biological Sciences provides a robust, yet flexible curriculum with an emphasis on studying the biological basis of health and disease. All students majoring in Biomedical Sciences will develop competence in the fundamental principles of biology and will gain experience in botany, zoology, cellular biology, microbiology, genetics, chemistry, mathematics and evolution. The Biomedical Sciences degree is designed to thoroughly prepare students for entrance into medical, dental, pharmacy, physician assistant, and other professional schools, as well as graduate study in the biomedical sciences and employment as a laboratory research assistant. No minor is required for the degree.

Required Courses for the Major

All Biomedical Sciences majors must complete the following core courses:

Code	Title	Hours
Course Requirements		
BIOL 1411	General Botany	4
BIOL 1413	General Zoology	4
BIOL 2440	Introductory Cell Biology	4
BIOL 3450	Introductory Genetics	4
BIOL 3470	General Microbiology	4
BIOL 4361	Introductory Evolutionary Bio	3
BIOL 4374 or MATH 1430	Biostatistics Calculus II	3
CHEM 1411	General Chemistry I	4
CHEM 1412	General Chemistry II	4
CHEM 2323	Organic Chemistry I: Lecture	3
CHEM 2123	Organic Chemistry I Lab	1
CHEM 2325	Organic Chemistry II: Lecture	3
CHEM 2125	Organic Chemistry II: Lab	1
CHEM 3438	Biochemistry I	4
MATH 1420	Calculus I	4
PHYS 1301	General Phy-Mechanics & Heat	3
PHYS 1101	General Physics Laboratory I	1
PHYS 1302	Gen Phy-Snd,Lght, Elec, & Mag	3
PHYS 1102	General Physics Laboratory II	1
Total Hours		58

Students may choose their area of specialization contingent upon completion of the required core courses.

- Bachelor of Arts, Major in Biology
- Bachelor of Science, Major in Biology

- Bachelor of Science, Major in Biomedical Sciences
- Bachelor of Science, Major in Composite Science-Biology Concentration
- Minor in Biology
- Minor in Environmental Science
- Minor in Conservation Biology

Student Organizations

- Beta Beta Beta (TriBeta) (<https://shsu.collegiatelink.net/organization/TriBeta>) is an undergraduate national Biological Honor society. The organization was founded in 1922 and the Delta Tau chapter at SHSU was chartered in 1965. TriBeta is dedicated to advancing the understanding and appreciation of the biological sciences and encouraging/supporting undergraduate student scientific research. TriBeta membership requires:
 - a declared major in Biology, Biomedical Sciences or related biological field; and
 - a dedicated interest in the life sciences (associate member) or completion of at least one 3000- or 4000-level biology course with a BIO GPA of 3.0 and overall SHSU GPA of 2.75 (regular member).

Membership invitations are sent to eligible students each fall and spring semester. Dr. Jim Harper (jmh091@shsu.edu) serves as faculty advisor to TriBeta.

- Sam Houston Association of Medical Oriented Students (SHAMOS) (http://www.shsu.edu/~org_shamos) membership is available to any student interested in pursuing a career in the medical or health professions. Activities include fundraisers, community service projects, blood drives with the Gulf Coast Regional Blood Center, and canned food drives. SHAMOS sponsors an outside speaker program to inform students of the opportunities and benefits of the various disciplines of the health professions (e.g., general and specialist dentistry, general and specialist medicine, occupational therapy, physician assistant, podiatry, forensic pathology, and EMS). Dr. (bio_arg@shsu.edu) Anne Gaillard (bio_arg@shsu.edu) serves as faculty advisor to SHAMOS.

Internships and Undergraduate Research

The Department of Biological Sciences believes that "hands on" experiences, through either internships or faculty-directed undergraduate research projects, are an important complement to a student's formal coursework. Moreover, undergraduate research experience is critical for students applying to graduate programs or professional schools. We therefore strongly encourage Biology students to consider participating in an undergraduate research project. Students seeking information regarding internships and/or undergraduate research experiences should contact the Department Chair Dr. Tamara Cook (CWH005@shsu.edu). Individual faculty members may be contacted for details regarding their research programs and independent research possibilities.

Academic Distinction

Graduation with "Academic Distinction in Biological Sciences" is available at SHSU. This honor is recognized at the commencement ceremony, posted to the diploma, and to the academic transcript. Requirements for earning Academic Distinction are:

- 1) Students must maintain a GPA in their major of 3.50 or above and overall GPA of 3.25 or above to be eligible for Academic Distinction.
- 2) Students must complete six hours in the Academic Distinction program by taking in sequence Senior Thesis I (BIOL 4398) and Senior Thesis II (BIOL 4399). These credits, by University rule, cannot count towards any requirement in the degree plan, i.e. they must be in addition to normal graduation requirements.
- 2) Before a student enrolls in BIOL4398 and declares an intention to earn Academic Distinction, the student must obtain written permission from the Department Chair, the Director of the Honors College, and the Academic Dean (Dean of Science and Engineering Technology).

If you are interested in the Academic Distinction program, please contact the Department Chair.

Scholarships

Academic scholarships are available from both the Department of Biological Sciences and the University to support student studies.

The Department of Biological Sciences scholarships include:

- Biology & Environmental Science Academic Scholarship
- Claude McLeod Academic Scholarship
- Emma Normand Academic Scholarship
- Everett Wilson Biology Endowment
- Harold F. Foerster Scholarship Endowment

- James D. Long Biology Endowment
- James Patrick Weber Environmental Science Award
- Patrick Neil O'Bryant Academic Scholarship
- Roy Turner Scholarship Endowment
- S.R. Warner Academic Scholarship
- William (Bill) R. Brinkley Scholarship Endowment
- Wilson-Warner Endowed Scholarship in the Biological Sciences

Departmental scholarship information may be obtained by writing to:

Scholarships
Department of Biological Sciences
Box 2116, SHSU
Huntsville, Texas 77341-2116

or by visiting Biology Scholarships. (http://www.shsu.edu/~bio_www/scholarships.html) Information on University scholarships may be obtained at Office of Academic Scholarships (<http://www.shsu.edu/dept/financial-aid/scholarships>) or telephone (936) 294-1672.

BIOL 1401. Environmental Science. 4 Hours.

A general course designed to cover all areas relating to contemporary ecological problems. Topics include air, water, and soil pollution; radiation, limnology, climate, pesticides, wastes, and land conservation. This course is designed for non-science majors to help them meet their General Education science requirement, and as an introductory course in environmental science for ENVR majors. BIOL 1401 cannot be applied to either a major or a minor in Biology.

Prerequisite: Demonstrated college-level readiness in reading, writing, and math.

BIOL 1408. Contemporary Biology. 4 Hours.

Presentation for the non-science major of biological concepts and topical subjects related to science methods, embryological development, reproduction, genetics, evolution, human organ systems, disease, and environmental biology. Ethical considerations of reproduction and birth control, genetic engineering, environmental pollution and population control will be included. This course is designed for non-science majors to help them meet their General Education science requirement and cannot be applied to either a major or a minor in Biology. Includes a 2 hour lab. Fall, Spring, Summer.

BIOL 1411. General Botany. 4 Hours.

General principles of botany are presented. Emphasis is placed on morphology, taxonomy, genetics, physiology, and ecology of plants in an evolutionary and ecological context. Students may begin sequence with either BIOL 1411 or BIOL 1413. Includes a 3 hour lab. Fall, Spring, Summer.

Prerequisite: Demonstrated college-level readiness in reading, writing, and math.

BIOL 1413. General Zoology. 4 Hours.

General principles of zoology are presented in an evolutionary context. Emphasis is placed on the anatomy, behavior, and ecology of animals. Students are introduced to evolutionary and ecological principles of biology. Students may begin sequence with either BIOL 1411 or BIOL 1413. Includes a 3 hour lab. Fall, Spring, Summer.

Prerequisite: Demonstrated college-level readiness in reading, writing, and math.

BIOL 1436. Foundations Of Science. 4 Hours.

The course focuses on the nature of science as a reliable method of acquiring knowledge about the natural world. Students will learn how to apply key scientific facts, concepts, laws and theories to distinguish science from non-science, bad science, and pseudoscience by analyzing a variety of claims and case studies. By employing an innovative, interdisciplinary approach to science education, this course is designed to increase science literacy and critical thinking skills for introductory-level students. This course is designed for non-science majors to help them meet their General Education science requirement and cannot be applied to either a major or a minor in Biology. Students must enroll concurrently in the corresponding lab for this course. Includes a lab.

Prerequisite: Demonstrated college-level readiness in reading, writing, and math.

BIOL 2320. Sustainability and Environment. 3 Hours.

In this course, students will investigate and assess the impacts that human activity can have on the environment and will seek to identify innovative, cross-disciplinary solutions to many of the world's most pressing environmental challenges. Given that Sustainability Science involves making decisions and taking actions that are in the interest of protecting the natural world, course topics will include current sustainability issues related to population growth, agriculture, natural resources, energy usage, habitat degradation and ecological economics. This course will typically be offered every other fall semester.

Prerequisite: BIOL 1401.

BIOL 2401. Human Anatomy. 4 Hours.

This course deals with structure and form of the human body. It includes studies of cells, tissues, and organ systems. Registration is primarily for students in pre-nursing or majors in kinesiology or health. Two-hour laboratory. Fall, Spring. Credit in this course cannot be applied to either a major or minor in Biology.

Prerequisite: Demonstrated college-level readiness in reading, writing, and math.

BIOL 2402. Human Physiology. 4 Hours.

This course will help students identify and understand the function of several important human organ systems and how these systems maintain homeostasis. Topics and the mechanisms involving circulation, digestion, metabolism, muscle action and respiration will receive the most emphasis. This course is designed to emphasize a clinical knowledge of physiology and techniques required by students studying nursing, physical therapy, and related health fields. Two-hour laboratory. Fall and Spring. Demonstrated college-level readiness in reading, writing, and math.

Prerequisite: Minimum grade of C in BIOL 2401 and CHEM 1406 or CHEM 1306 and CHEM 1106 or CHEM 1411 or CHEM 1311 and CHEM 1111.

BIOL 2403. Human Anatomy & Physiology I. 4 Hours.

This course is the first course in a two-semester sequence that examines the systems of the human body using an integrated approach. Emphasis will be given to the study of cells and tissues, and the anatomical and physiological interrelationships of the skeletal, muscular, and nervous systems and special senses. Laboratory exercises will enhance the student's appreciation and comprehension of the biological concepts of structure and function of the human body.

Prerequisite: Demonstrated college-level readiness in reading, writing, and math.

BIOL 2404. Human Anatomy & Physiology II. 4 Hours.

This course is the second course in a two-semester sequence that examines the systems of the human body using an integrated approach. Emphasis is placed on the study of the following systems: endocrine, cardiovascular, lymphatic and immune, respiratory, digestive, urinary, and reproductive. In addition this course requires in-depth application of topics related to cellular function and metabolism and of organ systems studied during Human Anatomy and Physiology I. Laboratory exercises will enhance the student's appreciation and comprehension of the biological concepts of structure and function of the human body.

Prerequisite: Minimum grade of C in BIOL 2403 and demonstrated college-level readiness in reading, writing, and math.

BIOL 2420. Intro Applied Microbiology. 4 Hours.

An introduction to microorganisms, their morphology, growth requirements, methods of culture, and the manner in which they affect health. Reactions

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