The Field of Biology
The study of biology involves the scientific analysis of living systems, and their origin and development. It also looks at the relationships between organisms and the environment, as well as the relevance of this knowledge to human affairs. Biology is intimately associated with all aspects of everyday life. Biology involves contemporary problems ranging from the spread of disease agents to global concerns for the biosphere.

The Department of Biology
The Department of Biology offers a Bachelor of Science degree with a curriculum that integrates the fields of physiology, anatomy, ecology, evolution, biodiversity, molecular, cellular and developmental biology. Students may focus their studies by combining courses in these areas of biological process with courses that survey a select group of living organisms, such as plants, animals, or microbes. In addition, students can prepare for a variety of professional careers, including medicine, dentistry, veterinary medicine, pharmacy, high school teaching, microbiology, wildlife management, fisheries, and biotechnology.

The faculty members of the Department of Biology have obtained their doctorates in a diverse range of biological disciplines and possess a broad range of biological expertise. Laboratory experiences, which accompany most upper-division courses in the department, allow students to work closely with individual faculty members. Student participation in faculty research is encouraged.

The department is housed in a well-equipped, modern facility, with up-to-date scientific equipment for use in laboratory and computational instruction. Greenhouse and animal care facilities provide additional support to the instructional programs. Field courses take full advantage of Fresno's central California location, offering trips to the Sierra Nevada, the Mojave Desert and the Pacific Coast. In addition, Fresno, in cooperation with six other CSU campuses, operates Moss Landing Marine Laboratories at Monterey Bay, providing instructional and research opportunities for Marine Biology degree programs.

At the graduate level, the Biology Department offers a Master of Science in Biology. The master's provides in-depth study into a select area of biological inquiry that requires completion of original research and submission of a formal master's thesis. In addition, the department houses and supports the interdisciplinary graduate programs in biotechnology, i.e., (1) the Master in Biotechnology (M.Bi.), a professional science master's degree that merges the molecular life sciences with business practices; and (2) the Certificate of Advanced Studies in Biotechnology, which includes a defined, laboratory-intensive, one-year program of study.

General Preparation
Biology students need an inquisitive mind, perseverance, and a desire to understand living systems. The importance of mathematical and writing skills cannot be overemphasized.

High School Preparation
Students should plan to meet California State University's admission requirements in terms of college preparatory course requirements, grade point average, and test scores. Secondary school students should pursue a rigorous high school curriculum that includes biology, physics, chemistry, and mathematics. Development of reading and writing skills is very important.

College Program
Students should consult the university's General Catalog for major requirements. All biology students are assigned faculty advisers when they arrive. Students should consult the General Catalog for information on specific requirements and course sequencing to meet the demands of the major. Community college transfers should consult www.assist.org to make sure the courses taken at the community college are transferable to Fresno State.
**General Education**

Students entering Fresno State as freshmen should embark on their lower-division major requirements immediately. General Education requirements should also be included in every semester of attendance to balance an otherwise heavy science laboratory load.

Community colleges can certify up to 39 of the units required of Fresno State's General Education program. Transfer students should concentrate more on science laboratory courses (including calculus and one year of chemistry) during completion of G.E. requirements.

**Suggested Related Activities**

Students wishing to enter biology professions are encouraged to volunteer in prospective jobs. Professional student organizations offer support for students in several areas.

**Course Requirements**

Since changes may occur, students should consult the General Catalog and a Fresno State adviser prior to registering for courses.

**Lower Division**

A year sequence course in Introductory Biology is required: BIOL 1A-1B, 1BL.

Additional requirements:
- General Chemistry (CHEM 1A-B)
- Calculus (MATH 70 or 75)
- Organic Chemistry (CHEM 128A; 129A)
- General Physics (PHYS 2A)

**Upper Division**

**CORE courses:**
- General Ecology (BIOL 101)
- Genetics (BIOL 102)
- Cellular Biology (BIOL 103)
- Genetics and Cellular Biology Laboratory (BIOL 104)
- Evolution (BIOL 105)

Requires a minimum of three upper-division biology (BIOL) courses with laboratory. Of these one must be designated as a diversity course, and one must be designated as a physiology course. See the General Catalog for diversity and physiology course designations.

Additional requirements:
- Biochemistry (CHEM 150 or 155)
- Statistics (MATH 101 or PSYCH 42)

**Biology Courses**

- Molecular Virology
- Microbiology
- Medical Microbiology
- Non-Vascular Plants
- Phycology
- Vascular Plants
- Plant Taxonomy
- Invertebrate Zoology
- Parasitology
- General Entomology
- Ichthyology
- Biology of Reptiles and Birds
- Mammalogy
- Plant Anatomy
- Comparative Vertebrate Morphology
- Neuroanatomy
- Molecular Biology
- Bioinformatics
- Experimental Molecular Genetics
- Microbial Genetics
- Developmental Biology
- Plant Growth and Development
- Immunology
- Immunology Lab
- Microbial Physiology
- Plant Physiology
- Comparative Animal Physiology
- Comparative Animal Physiology Lab
- Advanced Human Physiology
- Hematology
- Endocrinology
- Neurophysiology
- Terrestrial Ecology
- Aquatic Ecology
- Marine Biology
- Animal Behavior
- Ecological Case Study
- Field Methods in Ecology
- Systematic Biology
- Seminar in Cell and Molecular Biology
- Topics in Biology
- Independent Study

BIOL 119
BIOL 120
BIOL 121
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BIOL 181
BIOL 189T
BIOL 190

For additional information, write

California State University, Fresno
Department of Biology
2555 East San Ramon
M/S SB73
Fresno, California
93740-8034

Visit or call

Department of Biology
Science Building,
Room 106
559.278.2001
559.278.3963 fax