

# Biology

## 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.Bt.), 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](http://www.assist.org) to make sure the courses taken at the community college are transferable to Fresno State.

California State  
University, Fresno

Department of  
Biology

559.278.2001

B.S. in Biology

B.A. in Natural  
Sciences for the  
Single Subject  
Teaching Credential  
- Biology

Minor in Biology

*Preprofessional  
Advising in:*

- *Clinical Lab Science*
- *Dentistry*
- *Medicine*
- *Pharmacy*
- *Veterinary Medicine*

M.S. in Biology

M.S. in Marine Science

M.Bt. in Biotechnology

Certificate of Advanced  
Study (Graduate Level)  
in Biotechnology

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# Biology

## 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. Pre-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	BIOL 119
Microbiology	BIOL 120
Medical Microbiology	BIOL 121
Non-Vascular Plants	BIOL 122
Phycology	BIOL 123
Vascular Plants	BIOL 124
Plant Taxonomy	BIOL 125
Invertebrate Zoology	BIOL 130
Parasitology	BIOL 131
General Entomology	BIOL 132
Ichthyology	BIOL 134
Biology of Reptiles and Birds	BIOL 135
Mammalogy	BIOL 136
Plant Anatomy	BIOL 140
Comparative Vertebrate Morphology	BIOL 143
Neuroanatomy	BIOL 144
Molecular Biology	BIOL 150
Bioinformatics	BIOL 151
Experimental Molecular Genetics	BIOL 152
Microbial Genetics	BIOL 153
Developmental Biology	BIOL 155
Plant Growth and Development	BIOL 156
Immunology	BIOL 157
Immunology Lab	BIOL 157L
Cancer Biology	BIOL 158
Microbial Physiology	BIOL 160
Plant Physiology	BIOL 161
Comparative Animal Physiology	BIOL 162
Comparative Animal Physiology Lab	BIOL 162L
Advanced Human Physiology	BIOL 163
Hematology	BIOL 164
Endocrinology	BIOL 165
Neurophysiology	BIOL 166
Terrestrial Ecology	BIOL 171
Aquatic Ecology	BIOL 172S
Marine Biology	BIOL 173
Animal Behavior	BIOL 174
Ecological Case Study	BIOL 175
Field Methods in Ecology	BIOL 176
Systematic Biology	BIOL 178
Seminar in Cell and Molecular Biology	BIOL 181
Topics in Biology	BIOL 189T
Independent Study	BIOL 190

**For additional information, write**

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**PLEASE NOTE:** This document is for general informational purposes only. The information is subject to change; consult the appropriate department or an academic adviser. Entering freshmen must follow the revised General Education program effective fall 1999 and thereafter. The university catalog and schedule of courses are available online at [www.fresnostate.edu/ClassSchedule](http://www.fresnostate.edu/ClassSchedule) and [www.fresnostate.edu/catalog](http://www.fresnostate.edu/catalog).

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