

# Biotechnology, M.Bt.

## DEPARTMENT

### Department of Biology

Paul Crosbie, Chair  
Science Building, Room 106  
559.278.2001  
FAX: 559.278.3963  
[www.fresnostate.edu/biology](http://www.fresnostate.edu/biology)

MN in Biology, Minor  
MS in Biology, M.S.  
MBT in Biotechnology, M.Bt.  
BS in Biology, B.S.  
CERT in Biotechnology, Certificate of Adv. Study  
CRED in Professional Clear Foundation Level General Science  
CRED in Single Subject Credential - Biological Science

The Department of Biology offers a diversified undergraduate program that matches the breadth and excitement of modern biology and prepares students for the hundreds of career opportunities that use biology as a foundation. The Bachelor of Science degree is awarded to those students who successfully complete the biology core and additional requirements and electives.

### The biology major we offer has three programmatic goals:

1. To provide students with a solid foundation in all aspects of modern biology and also the intellectual skills that will serve as the basis for a lifetime of future achievement.
2. To provide students with the specialized educational opportunities that will allow them to compete successfully for careers in the biological sciences or for advanced studies in major doctoral programs.
3. To provide preprofessional students with the knowledge needed for advanced study in the many fields that build upon a biological foundation.

Our undergraduate biology major is excellent preparation for graduate programs in clinical laboratory science, medicine, dentistry, pharmacy, veterinary medicine, optometry, doctoral programs, and many others.

The department offers a Master of Science in biology for qualified students who wish to explore some part of biology in greater depth.

### Facilities

The department is housed in a well-equipped science building. Among the specialized equipment and technologies available for students are Polymerase Chain Reaction (PCR) thermocyclers; apparatus for conducting molecular and immunological analysis of nucleic acids and proteins; genetic recombination, including use of electroporation and gene guns; a bioinformatics computing laboratory; a proteomics work station; cell and tissue culture facilities; fermenters and bioreactors; fluorescence, confocal and 4-D microscopes; ultracentrifugation; radioactive materials methodologies; and metabolic studies on all types of life forms. Excellent greenhouse and animal care facilities, as well as media/reagent production complexes, support the instructional and research programs.

Fresno's proximity to both the Sierra Nevada and the Pacific coast provides a natural laboratory with numerous field trip opportunities that are rarely equaled at other institutions. High Sierra, Mediterranean, desert, foothill, coastal, and forest environments are all within a three-hour drive of the campus. The department maintains a wealth of field equipment to observe and collect wild organisms. A self-contained pond ecosystem offers a unique, on-campus study resource. The department also maintains extensive collections of museum specimens of insects, vertebrates and a herbarium. The department is a member of a consortium that manages and operates the Moss Landing Marine Laboratory (MLML). Students can study and conduct research at MLML, located on the Monterey Bay.

## REQUIREMENTS

## Master of Biotechnology Requirements

The Master of Biotechnology offers students who are fundamentally educated in varied scientific disciplines the opportunities to advance their scientific skills. It allows them to acquire the business knowledge and skills necessary to commercialize emerging technologies or their products. Offered as a two-year program, it is representative of a unique interdisciplinary degree concept, the Professional Science Master's (PSM) degree, designed for students interested in entering the workforce in leadership roles to promote the development and production of new products and processes.

### Admission Requirements for the M.Bt.

Students must complete university graduate division admission requirements and must possess an appropriate four-year undergraduate science degree with a minimum 3.0 GPA. There are six categories of specific course prerequisites; completion of three categories constitutes the minimum for classification, but five categories must be completed prior to award of degree. Fresno equivalent courses are indicated in parentheses.

Prerequisite courses are as follows:

General Genetics (BIOL 102, 103) Microbiology with Lab - BIOL 120) Biochemistry with Lab (CHEM 150/155A & 156) Immunology with Lab (BIOL 157 and 157L) Analytical Chemistry (CHEM 102/105) Statistics (MATH 101)

### Master of Biotechnology Degree Requirements

#### I. Core Curriculum (21 units)

- A. BIOL/CHEM 241A-B (3-3 units)
- B. BIOL/CHEM 248 (1-1 units)\*
- C. MBA 270 (3 units)
- D. MBA 272 or 273 (3 units)
- E. BIOTC 275 (3 units)
- F. BIOTC 298 or 299 (4 units)

#### II. Electives (9 units)

Minimum of three courses in separate categories A-K; only one may be undergraduate.

- A. BIOL/CHEM 242 (3 units)
- B. BIOL/CHEM 243 (3 units)
- C. BIOL/CHEM 244 (3 units)
- D. BIOL 245 (3 units)
- E. AGRI 200 or BIOL 274 (3 units)
- F. PLANT 108 (3 units)
- G. CSCI 101 (3 units)
- H. CHEM 106 (4 units)
- I. FSC 120 (4 units)
- J. FSC 178 (2 units)
- K. MBA 272 or 273 \*\* (3 units)
- L. PHIL 123 (3 units)

#### Total (30 units)

\* The Graduate Writing Requirement is completed in conjunction with the second enrollment of BIOL/CHEM 248. Consult adviser for details.

\*\* Only the course not taken to fulfill core curriculum, item D, is allowed for credit.

## FACULTY

Faculty expertise spans the range of biology from the molecular to the ecological, with a broad representation of taxonomic specialties. Laboratories in most upper-division majors' courses are taught by faculty, and individualized student/faculty research participation through independent study is strongly encouraged.

Faculty members have garnered independent research funding from various agencies including the National Institutes of Health, National Science Foundation, U.S. Department of Agriculture, Environmental Protection Agency, and National Sea Grant. Faculty and students also participate in collaborative studies on, for example, medical and clinical topics with local

physicians and hospitals; agricultural topics with the University of California Kearney Agricultural Research and Extension Center, Agricultural Research Service San Joaquin Valley Agricultural Sciences Center in Fresno/Parlier; ecological and environmental topics with California Department of Fish and Wildlife, U.S. Forest Service and Endangered Species Recovery Project; and science educational topics with regional school districts and state and national credentialing agencies.

For faculty phone numbers and e-mail, see the campus directory.

For more on the faculty, see the faculty pages.

The faculty pages are updated by the department or program.

Name	Degree	Email	Phone
Abou Naoum, Michelle M	Bachelor of Arts	mabounaoum@csufresno.edu	
Adineh, Shadi	Bachelor of Science	shajiadineh@csufresno.edu	
Andrews, David M	Doctorate of Education	davidan@csufresno.edu	559.278.5174
Benoit, Lora		lorabenoit@mail.fresnostate.edu	
Blumenshine, Steven C	Doctor of Philosophy	sblumens@csufresno.edu	559.278.8770
Bush, Jason A	Doctor of Philosophy	jbush@csufresno.edu	559.278.2068
Calderon-Urrea, Alejandro	Doctor of Philosophy	calalea@csufresno.edu	559.278.4080
Chooljian, Karen M	Master of Science	kachooljian@csufresno.edu	559.278.2497
Coffman, Stephanie R	Doctor of Philosophy	scoffman@csufresno.edu	
Constable, John V	Doctor of Philosophy	jconstable@csufresno.edu	559.278.2410
Constable, Julie L	Doctor of Philosophy	juconstable@csufresno.edu	559.278.2001
Crosbie, Paul R	Doctor of Philosophy	pcrosbie@csufresno.edu	559.278.2074
Gousset, Karine	Doctor of Philosophy	kgousset@csufresno.edu	559.278.5802
Hovhannisyan, Anahit	Doctor of Philosophy	ahovhannisyan@csufresno.edu	
Kern, Ruth A	Doctor of Philosophy	rakern@csufresno.edu	559.278.4075
Lent, David D	Doctor of Philosophy	dlent@csufresno.edu	559.278.3966
Lin, Joseph Y	Master of Science	jlin@csufresno.edu	
Linman, Lynn C	Master of Arts	llinman@csufresno.edu	
Mcclelland, Angela M	Master of Science	amcclelland@csufresno.edu	
Miles, Christopher R	Bachelor of Arts	cmiles@csufresno.edu	
Mitchell, Marilyn C		mamitchell@csufresno.edu	

Name	Degree	Email	Phone
Mohan, Archana V	Master of Science	amohan@csufresno.edu	
Muller, Ulrike	Doctor of Philosophy	umuller@csufresno.edu	559.278.2532
Rawat, Mamta	Doctor of Philosophy	mrawat@csufresno.edu	559.278.2003
Reece, Amber J		areece@csufresno.edu	
Reece, Joshua S	Doctor of Philosophy	joreece@csufresno.edu	
Riley, Larry G	Doctor of Philosophy	lriley@csufresno.edu	559.278.2997
Ross, Joseph A	Doctor of Philosophy	jross@csufresno.edu	559.278.4074
Strankman, Andrew W	Master of Science	astrankman@csufresno.edu	559.278.2696
Tamayo, Rachel P	Master of Science	racheltamayo@csufresno.edu	
Telemeco, Melissa S	Master of Arts	mtelemeco@csufresno.edu	
Telemeco, Rory S	Doctor of Philosophy	telemeco@csufresno.edu	
Tsukimura, Brian K	Doctor of Philosophy	briant@csufresno.edu	559.278.4244
Van Laar, Tricia	Doctor of Philosophy	tvanaar@csufresno.edu	
Vargas, Jamie H	Master of Science	jstiffler21550@mail.fresnostate.edu	
Walter, Emily M	Doctor of Philosophy	ewalter@csufresno.edu	
Waselkov, Katherine	Doctor of Philosophy	kwaselkov@csufresno.edu	
Whalen, William A	Master of Science	williamwhalen@mail.fresnostate.edu	
Wright, Alice	Doctor of Philosophy	awright@csufresno.edu	559.278.7692
Youn, Hwan	Doctor of Philosophy	hyoun@csufresno.edu	559.278.8305