

BIOLOGY

POINT LOMA
NAZARENE
UNIVERSITY
DEPARTMENT OF

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OBJECTIVES

The objectives of the biology department at PLNU coincides with the University mission to Teach, Shape, and Send.

To Teach: Our commitment is to provide students the opportunity to build a broad foundation in the major disciplines of biology, in the process of science skills, and in the critical thinking/quantitative skills that are required to apply their education to real world settings.

To Shape: In addition to the formal academic interactions, each student will have opportunities to enter into mentoring relationships with our faculty through advising, lab assisting, research experiences, and departmental social functions. In these contexts, students can expect to dialogue about issues relating to their own personal and professional goals, the interface between biology and our society, and the relationship between faith and science.

To Send: The graduates of the Biology department will be able to apply both their faith and education in biology related professions, such as medicine, allied health fields, education, or industry. They will feel confident that they have been well prepared to positively contribute in these fields, and society in general.

TRADITION OF EXCELLENCE...

The Department of Biology is dedicated to the success of the students, and offers a wealth of opportunities for students who are interested in pursuing work in science related fields. For students whose interests and academic needs lie in both biology and chemistry, an interdepartmental major in Biology-Chemistry has been designed to prepare students for biochemistry, immunology, molecular biology, pharmacology, physiology, medicine, and dentistry. Biology students have the opportunity to work side-by-side with their professors doing faculty-assisted research projects, and may become co-authors on scholarly papers in national and international scientific journals. Many students present research at various science conferences. Students also have sophisticated instrumentation and computational resources at their fingertips for use in science courses and research labs.

All of these opportunities have been given to students through the help of numerous grants from governmental agencies such as the National Institutes of Health and the National Science Foundation, various private organizations, steady cooperation from University administration, and strong financial backing by Biology and Chemistry alumni. Since 1977, alumni of the Department of Biology have contributed an average of more than \$12,000 per year in support of the science instruction and research programs.

CAREER OPPORTUNITIES...

Students who graduate with a degree from the Department of Biology leave PLNU prepared for graduate schools or careers in industry. Over the last 25 years, approximately 80% of PLNU's applicants have gained acceptance into medical schools (roughly twice the national average), and the acceptance rate for Biology and Chemistry students applying to graduate (M.A., M.S., and Ph.D.) and dental school programs is approximately 95 percent.

MAJORS

Majors

- Biology
 - Organismal
 - Cell and Molecular
- Biology-Chemistry

FACULTY

- David E. Cummings, Ph.D.
University of Idaho
- Darrel R. Falk, Ph.D.
University of Alberta
- Rebecca J. Flietstra, Ph.D.
University of Kansas Medical Center
- Kerry D. Fulcher, Ph.D., Chair
University of Idaho
- David K. Kerk, Ph.D.
University of California, Los Angeles
- Michael R. McConnell, Ph.D.
Tufts University School of Medicine



Michael S. Mooring, Ph.D.
University of California, Davis

Dawne M. Page, Ph.D.
University of California, San Francisco

Biology (B.A.) MAJOR

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
Biology		
BIO 110*	Cell Biology and Biochemistry	.4
BIO 120*	Animal Biology	.4
BIO 240*	Genetics	.4
Chemistry		
CHE 152*	General Chemistry I	.4-5
CHE 153*	General Chemistry II	.4
CHE 295*	Organic Chemistry	.5
Mathematics		
MTH 144*	Calculus with Applications	.4
MTH 131	Computer Aided Calculus	.1
TOTAL		.30-31

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
BIO 300*	Biomathematics and Bioinformatics	.3
BIO 310	General Botany	.4
BIO 350	Advanced Cell Biology	.3
BIO 360	Ecology	.3
BIO 380	Molecular Biology	.3
BIO 420	Vertebrate Physiology	.3
BIO 497 *	Biology Seminar	.1
TOTAL		.20

Complete one of the following three options.

Track I - Organismal Emphasis- Take Track I electives to a minimum of 8 units.

Track II - Cell and Molecular Emphasis- Take Track II electives to a minimum of 9 units.

Track III - Individualized Emphasis - Take 1 elective from Track I or 1 elective from Track II (minimum 3 units) plus a combination of two upper division, non-GE courses from inside or outside of Biology approved by the Department Chair.

Track I Electives

COURSE #	TITLE	UNITS
BIO 320	Marine Zoology	.3
BIO 330	Marine Invertebrate Zoology 2 (quad)	
BIO 340	Field Biology:	.2 (quad)
BIO 370	Marine Plant and Microbial Life	.2 (quad)
BIO 410*	Vertebrate Biology	.3
BIO 430	Animal Behavior	.3

Track II Electives

BIO 390	Immunology	.3
BIO 400	Developmental Biology	.3
BIO 450	Advanced Biochemistry	.4
BIO 470	Neuroscience	.3
Upper Division Elective Total		.8-9
Bachelor of Arts Total		.58-60

(Note: Courses with superscript "*" are required by the state for the Teacher Education concentration in Life Sciences)

Biology (B.S.) MAJOR

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
BIO 110*	Cell Biology and Biochemistry	.4
BIO 120*	Animal Biology	.4
BIO 240*	Genetics	.4
CHE 152*	General Chemistry I	.4-5
CHE 153*	General Chemistry II	.4
CHE 295*	Organic Chemistry	.5
MTH 144*	Calculus with Applications	.4
MTH 131	Computer Aided Calculus	.1
PHY 141	General Physics I	.4
PHY 142	General Physics II	.4
TOTAL		.38-39

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
BIO 300 *	Biomathematics and Bioinformatics	.3
BIO 310	General Botany	.4
BIO 350	Advanced Cell Biology	.3
BIO 360	Ecology	.3
BIO 380	Molecular Biology	.3
BIO 420	Vertebrate Physiology	.3
BIO 497 *	Biology Seminar	.1
TOTAL		.20

Complete one of the following two options.

Track I: Organismal Emphasis - Take 3 Track I electives and 1 Track II elective (minimum 10 units).

Track II: Cell and Molecular Emphasis - Take 3 Track II electives and 1 Track I Elective (minimum 11 units).

Track I Electives

COURSE #	TITLE	UNITS
BIO 320	Marine Zoology	.3
BIO 330	Marine Invertebrate Zoology 2 (quad)	
BIO 340	Field Biology:	.2 (quad)
BIO 370	Marine Plant and Microbial Life	.2 (quad)
BIO 410*	Vertebrate Biology	.3
BIO 430	Animal Behavior	.3

Track II Electives

COURSE #	TITLE	UNITS
BIO 390	Immunology	3
BIO 400	Developmental Biology	3
BIO 450	Advanced Biochemistry	4
BIO 470	Neuroscience	3
	Upper Division Elective Total	11-13
	Bachelor of Science Total	68-72

(Note: Courses with superscript "*" are required by the state for the Teacher Education concentration in Life Sciences)

Biology-Chemistry (B.S.) MAJOR

The interdepartmental major in Biology-Chemistry has been designed for those students whose academic needs and interests lie in both biology and chemistry. The major was instituted because a large segment of contemporary scientific interest lies at the intersection of these two fields. Areas well served by this preparation include medicine, dentistry, and several graduate disciplines, including biochemistry, physiology, and molecular biology. This major earns a Bachelor of Science degree.

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
BIO 110	Cell Biology and Biochemistry	4
BIO 120	Animal Biology	4
BIO 240	Genetics	4
CHE 152	General Chemistry I	4
CHE 153	General Chemistry II	4
CHE 211	Analytical Chemistry	2
CHE 295	Organic Chemistry I	5
PHY 141	General Physics I	4
PHY 142	General Physics II OR	
PHY 241	University Physics I	4
PHY 242	University Physics II	4
MTH 144	Calculus for the Life Sciences and Business	4
	TOTAL	44

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
BIO 380	Molecular Biology	3
BIO 497	Biology Seminar	1
CHE 300	Organic Chemistry II	2
CHE 325	Physical Chemistry I	5
CHE 351	Organic Qualitative Analysis	2
CHE 466	Advanced Inorganic Chemistry	2
CHE 326	Physical Chemistry II OR	
CHE 370	Instrumental Analysis OR	
CHE 453	Advanced Organic Chemistry	2
BIO 450	Advanced Biochemistry OR	
CHE 450	Advanced Biochemistry	4

Three courses from:

BIO 300	Biomathematics and Bioinformatics	3
BIO 350	Advanced Cell Biology	3
BIO 390	Immunology	3
BIO 400	Developmental Biology	3
BIO 420	Vertebrate Physiology	3
	TOTAL	39

Biology COURSES

BIO 101 (4) HUMAN BIOLOGY AND BIOETHICS -GE

An exploration of assorted topics in human biology as they intersect with bioethical and sustainability issues of current interest in society. Topics include human physiology, health, reproduction, genetics, and ecology. Course examines the underlying scientific basis of specific examples and how they relate to everyday life. Course approach emphasizes the process of science, critical thinking, active learning, social relevancy, and building connections between case studies and general concepts of biology. Lecture and inquiry-based lab. Offered every year.

BIO 102 (4) ENVIRONMENT AND PEOPLE-GE

A systematic overview of major topics in global ecology as they relate to environmental science and human use of natural resources. Includes such topics as sustainable development, population growth, food, agriculture, land degradation, urbanization, pollution, poverty, sanitation, health care, biodiversity, and war. The implications for wise resource management, bioethics, economics, and governmental policy. Course approach emphasizes the process of science, critical thinking, active learning, social relevancy, and building connections between case studies and general concepts. Lecture. Offered every year.

BIO 103 (4) INTRODUCTION TO BIOLOGY-GE

Designed to meet the requirements for the California Multiple Subject Teaching Credential for teaching grades K-8 (but open to all students). The subject areas include zoology, botany, physiology, cell structure, ecology, genetics, and evolution. Course explores major themes in these subject areas as they relate to everyday life, ethical concerns, conservation issues, and common misunderstandings. Course approach emphasizes the process of science, critical thinking, active learning, social relevancy, and building connections between case studies and general concepts of biology. Lecture and inquiry-based lab. Offered every year.