

# BIOLOGY

*Biology*

Kerry Fulcher, Ph.D., Chair | Rohr Science Hall | 619.849.2651

## *Objectives*

- To prepare students for graduate study in science, medicine, and various allied health professions;
- To provide training in preparation for teaching at the elementary or secondary level;
- To provide training for entry into industrial positions utilizing life science technology;
- To provide research experience in biology to interested students;
- To serve allied science departments with focused courses in necessary aspects of biology;
- To introduce the liberal arts student to fundamental biological concepts that are relevant to life, values, and culture;
- To examine with students the interaction of biology with Christian faith.

## *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.

## *Step Into Your Future...*

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 and Minors*

### *Majors*

Biology  
Biology-Chemistry

## *Faculty*

David Brown, Ph.D.  
*University of Oklahoma*

Darrel Falk, Ph.D.  
*University of Alberta*

Rebecca Flietstra, Ph.D.  
*University of Kansas Medical Center*

Kerry Fulcher, Ph.D.  
*University of Idaho*

David Kerk, Ph.D.  
*University of California, Los Angeles*

Michael McConnell, Ph.D.  
*Tufts University School of Medicine*

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

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

"By thus acquainting and familiarizing ourselves with the works of nature, we become as it were a member of her family, a participant in her felicities; but while we remain ignorant, we are like strangers and sojourners in a foreign land, unknowing and unknown."

~ John Wesley

# Biology *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
CHE 153*	General Chemistry II	4
CHE 295*	Organic Chemistry I	5
MTH 123*	Elementary Functions	3
MTH 145*	Calculus I with Applications	5
TOTAL		33

## 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
Additional Track I Courses to a total of		12
Additional Track II Courses to a total of		9
Additional Track I, Track II or upper-division level courses outside Biology approved by department chair**		5
TOTAL		47

### Track I

COURSE #	TITLE	UNITS
BIO 310*	General Botany	4
BIO 320	Marine Zoology	3
BIO 330	Marine Invertebrate Zoology	2
BIO 340	Field Biology	2
BIO 360*	Ecology	3
BIO 370	Marine Plant and Microbial Life	2
BIO 410*	Vertebrate Biology	3
BIO 420*	Vertebrate Physiology	3
BIO 430	Animal Behavior	3

### Track II

COURSE #	TITLE	UNITS
BIO 350*	Advanced Cell Biology	3
BIO 380*	Molecular Biology	3
BIO 390	Immunology	3
BIO 400	Developmental Biology	3
BIO 450	Advanced Biochemistry	4
BIO 470	Neuroscience	3

## TEACHER EDUCATION REQUIREMENTS

One of the following:

COURSE #	TITLE	UNITS
BIO 302	Scientific Issues in Society	4
BIO 390	Immunology	3
BIO 400	Developmental Biology	3
BIO 450	Advanced Biochemistry	4

\* Required by the state for the Teacher Education Concentration in Life Sciences)

\*\*Biology 302 is required to receive "subject matter competence" from the Commission on Teacher Credentialing.

## RECOMMENDATION

Biology majors planning to pursue graduate or professional studies should also take either:

COURSE #	TITLE	UNITS
PHY 141	General Physics I	4
PHY 142	General Physics II <b>OR</b>	
PHY 241	University Physics I	4
PHY 242	University Physics II	4

## Biology-Chemistry (BS)

*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 <b>OR</b>	
PHY 241	University Physics I	4
PHY 242	University Physics II	4
MTH 145	Calculus I with Applications	5
TOTAL		44

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*Biology*

## 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 <i>OR</i>	
CHE 370	Instrumental Analysis <i>OR</i>	
CHE 453	Advanced Organic Chemistry	2
BIO 450	Advanced Biochemistry <i>OR</i>	
CHE 450	Advanced Biochemistry	4
<i>Three courses from:</i>		
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

A systematic examination of the operation of the human body as well as a discussion of current issues in which biological knowledge impacts society. Lecture and lab.

### BIO 102 (4) ENVIRONMENTAL BIOLOGY-GE

A study of natural resource waste, pollution, and overpopulation with possible solutions through effective earth stewardship in conservation, recycling, birth control and other means. Lecture.

### BIO 110 (4) CELL BIOLOGY AND BIOCHEMISTRY-GE

An introduction to the principles of cell biology and biochemistry. Topics to be discussed include the chemical basis of life, the structure and function of cellular organelles, basic metabolic pathways, the expression of the genetic material, recombinant DNA technology and models for the origin of cells. Lecture and lab.

*Prerequisite: Must have a previous course in high school or university-level chemistry.*

### BIO 120 (4) ANIMAL BIOLOGY

Principles of animal structure, function, and diversity. Lecture and lab.

*Prerequisite: Biology 110.*

### BIO 130 (4) HUMAN ANATOMY AND PHYSIOLOGY I-GE

The first course of a two-semester sequence which examines the human body from an integrated perspective. Topics include an introduction to chemistry and cell function, tissue types, skeletal system, muscular system, and nervous system. Does not count for credit toward a Biology major. Lecture and lab.

*Prerequisite or Corequisite: Chemistry 103 or Chemistry 152.*

### BIO 140 (4) HUMAN ANATOMY AND PHYSIOLOGY II

The second semester of a sequence which examines the human body from an integrated perspective emphasizing the interrelationship of structure and function. Topics include endocrine system and reproduction, cardiovascular system, immune system, respiratory system, digestive system, and urinary system. Does not count for credit toward a Biology major. Lecture and lab.

*Prerequisite: Biology 130.*

### BIO 220 (5) MICROBIOLOGY OF INFECTIOUS DISEASES

A study of microbial physiology, the diseases associated with infections by certain pathogenic microbes and the vertebrate response to microbial infections. Does not apply toward the Biology major. Lecture and lab.

*Prerequisites: Biology 140 and Chemistry 103.*

### BIO 240 (4) GENETICS

The study of the inheritance, organization, expression and variability of genes. Lecture and lab.

*Prerequisite: Biology 120.*

### BIO 300 (3) BIOMATHEMATICS AND BIOINFORMATICS

An examination of the importance of mathematical concepts, techniques and computer applications to contemporary biology. Lecture and lab topics include statistics, mathematical modeling, computer analysis of biological molecules, and the use of the Internet.

*Prerequisites: Biology 110 and Mathematics 145.*

### BIO 302 (4) SCIENTIFIC ISSUES AND SOCIETY

Historical and current analysis of the progress of the biological and physical sciences and the impact of that progress on society. Offered 2003-04.

*Prerequisites: Biology 240; and one of the following - Physics 103, 141, or 241.*

### BIO 310 (4) GENERAL BOTANY

Principles of plant structure, function and diversity. Lecture and lab.

*Prerequisite: Biology 110.*