

Biology

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Faculty

Daniel K. Brannan, *Professor*
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 Patricia Hernandez, *Professor*
 Jennifer Huddleston, *Assistant Professor*
 Rebecca Hunter, *Assistant Professor*
 Tom Lee, *Professor*
 James R. Nichols, *Professor*
 Qiang Xu, *Associate Professor*

Majors: Biology (BA)
 Biology (BS)
 High School Teacher Certification - Life Science (BS)

Minor: Biology

The Department of Biology offers the Bachelor of Science degree and the Bachelor of Arts degree with a major in biology or biology for teacher certification. The department works with the Department of Teacher Education to offer a Bachelor of Science: High School Certification Life Science (Grades 8-12) degree. A minor in biology may be added to other majors.

Introduction

The Department of Biology educates students for Christian service and leadership throughout the world by preparing them to become biological scientists, pre-college teachers and health-care professionals. The Bachelor of Science: High School Certification Life Science (Grades 8-12) is the avenue for preparation of pre-college teachers. The Bachelor of Science and Bachelor of Arts in biology are the avenues for:

- **Cellular/molecular biology emphasis.** Much of modern biology exists at the interface of biology and chemistry. Through effective classes, laboratories and research opportunities the Department of Biology effectively draws students to the molecular/biochemical level of life. Many students in health-care professions also choose this emphasis.
- **Organismal biology/field emphasis.** An array of field biology oriented courses, research opportunities, and field trips to such sites as Honduras, Big Bend, Texas, and New Mexico offer study experiences in marine, fresh water, and land ecosystems. These opportunities are supplemented by ACU being a participating university with the Au Sable Institute. Au Sable offers field courses in the beautiful north woods country of Michigan's Lower Peninsula and on Whidbey Island in Puget Sound between Vancouver and Seattle. Au Sable's mission is "the integration of knowledge of the creation with biblical principles for the purpose of bringing the Christian community and the general public to a better understanding of the Creator and the stewardship of God's creation." This fits well with the goal of ACU's Biology Department.

Health professions/human biology emphasis. Historically ACU Biology graduates have been accepted to medical and dental schools, as well as other health-care programs, at almost twice the national average. This is a result of high quality classes and laboratories emphasizing human biology and the leveling effect of

learning to use human healing gifts in God's service. Medical missions receives clear emphasis in the Department and many students participate during their career in one or more medical missions trips, many of them coordinated through our long-term relationship with Health Talents International (HTI). The majority of these efforts are in Guatemala. HTI's mission is "to proclaim the gospel of Jesus Christ through teaching and healing ministries." ACU's relationship with HTI provides students an opportunity to blend faith and learning in an applied manner that serves the spiritual and physical health needs of others throughout the world.

- **Pre-veterinary medicine emphasis.** ACU graduates have achieved high acceptance rates to veterinary schools as a result of high quality classes and laboratories emphasizing animal anatomy, physiology, pathology, nutrition, and genetics. The pre-veterinary option satisfies requirements for admission to veterinary school and related medical technical fields or graduate school for study in animal genetics, nutrition, pathology, and physiology.
- **Wildlife biology emphasis.** This option is designed for students interested in understanding, managing, and conserving wildlife species and the ecosystems that support them. Wildlife biology students will gain fieldwork experience throughout the American Southwest as well as at the Au Sable Institute in Michigan. Courses taken in this emphasis provide the opportunity to obtain professional certification as an Associate Wildlife Biologist through The Wildlife Society. This certification serves as a standardized mark of accomplishment and a measure of professional status and credibility in the field of wildlife biology. Professional certification also may set graduates apart from others in a competitive marketplace and allow a greater range of career opportunities.
- **Environmental biology emphasis.** This emphasis provides the rigorous training in biology and physical sciences needed for admission into ecology and environmental science graduate degree programs as well as careers within governmental and nongovernmental agencies and environmental firms dealing with biological conservation. Students choosing this option will participate in field biology and environmental science courses both at ACU and the Au Sable Institute of Environmental Studies in Michigan.
- **General biology emphasis.** Some students prefer to pursue a more general biology program that allows them to touch many different areas. Past students have used this emphasis to enter law school, gain employment in industry or government, or in science writing.
- **Biology/business emphasis.** Students interested in mixing a strong biology education with some key courses from the world of business would find this track helpful. It includes a full set of biology courses and adds basic courses in such areas as accounting, management, and marketing. Students might use this emphasis to lead toward a career in health care administration, pharmaceutical sales, or law.

Study Abroad Expectations

All students are encouraged to participate in ACU's Study Abroad program. Classes offered at Study Abroad sites vary depending on the site. Academic advisors can assist students in planning ahead for their Study Abroad experience and should be consulted during the freshman year.

Bachelor of Science Degree (BS)

The Bachelor of Science degree in Biology is needed for most graduate schools with programs in the biological sciences. Most health professions schools require a bachelor's degree in any field including all of the liberal arts, provided the prerequisite science and math courses are taken. Discuss the specific requirements with the pre-health professions advisor.

Admission Requirements

Before being admitted to the BS in biology, a student must satisfy the requirements listed in the ACT/SAT Placement Information section of this catalog (page 20).

BIOLOGY (BS)

BS: BIOLOGY DEGREE PLAN (BIOL)	
UNIVERSITY REQUIREMENTS	
Please see the University Requirements section of this catalog (page 39).	
MAJOR REQUIREMENTS	
Biology	
BIOL 112 General Biology I	(3)1
BIOL 114 General Biology I Lab	1
BIOL 113/115 General Biology II Lecture/Lab	4
BIOL 221/223 Animal Biology Lecture/Lab or	4
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOL 312 Cell Biology	3
BIOL 362 Ecology	3
BIOL 497 Seminar in Biology (capstone and writing-intensive course)	3
TOTAL	4811
1Hours (in parentheses) may also fulfill university requirements and are not included in total major hours	

SUPPLEMENT FOR MAJOR (TRACKS)	
CELLULAR/MOLECULAR BIOLOGY Track (BICM)	
BIOL 221/223 Animal Biology Lecture/Lab <i>or</i>	
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOL 312 Cell Biology	3
BIOL 472 Biochemistry I	3
BIOL 475 Molecular Genetics	
	3
BIOL 476 Biotechnology Laboratory	2
BIOA <i>or</i> BIOL Selections: 13 hours of which 9 hours are 300-499	13
TOTAL	3428
GENERAL BIOLOGY Track (BIOG)	
BIOL 221/223 Animal Biology Lecture/Lab <i>or</i>	
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOL 312 Cell Biology <i>or</i> BIOL 351 Genetics	3
21 hours BIOA <i>or</i> BIOL of which 17 hours are 300-499	21
TOTAL	3428
HEALTH PROFESSIONS Track (BIOH)	
BIOL 221/223 Animal Biology Lecture/Lab <i>or</i>	
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOL 312 Cell Biology	3
BIOL 355/357 Microbiology	4
BIOL 491/493 Human Anatomy	4
BIOL 492/495 Physiology	4
BIOL Selections: 9 hours of which 5 hours are 300-499	9
TOTAL	3428
ORGANISMAL BIOLOGY Track (BIOO)	
BIOL 221/223 Animal Biology Lecture/Lab	4
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOL 312 Cell Biology	3
BIOL 351 Genetics	3
BIOL 364 Ecology Laboratory	1
BIOL 492 Physiology	3
Choose 2-2 from	87
BIOL 355/357 Microbiology <i>or</i> BIOL 370 Field Biology <i>or</i>	
BIOL 380 General Mammalogy <i>or</i> BIOL 403 Marine	
Biology <i>or</i> BIOL 425 Behavioral Biology: Theory &	
Methods <i>or</i> BIOL 481 Plant Systematics <i>or</i> BIOL 483	
BioStatistics <i>or</i> BIOL 492/495 Physiology	
BIOA <i>or</i> BIOL Selections: 10 hours of which 6 hours are 300-499	10
TOTAL	2428
PRE-VETERINARY MEDICINE Track (BIOV)	
BIOL 221/223 Animal Biology Lecture/Lab	4
BIOL 312 Cell Biology	3
BIOL 351 Genetics	3
BIOL 355/357 Microbiology Lecture/Lab	4
BIOL 472 Biochemistry I	3
BIOL 492/495 Physiology Lecture/Lab	4
TOTAL	21
WILDLIFE BIOLOGY Track (BIOW)	
BIOL 221/223 Animal Biology Lecture/Lab	4
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOA 345 Wildlife Ecology	4
BIOL 351 Genetics	3
BIOA 362 Environmental Applications for Geographic Information	
Systems (GIS)	4
BIOL 364 Ecology Laboratory	1
BIOL 370 Field Biology	4
BIOL 380 General Mammalogy	4
BIOL 481 Plant Systematics	4
BIOL 483 Biostatistics	3
TOTAL	35
ENVIRONMENTAL BIOLOGY Track (BIOE)	
BIOL 221/223 Animal Biology Lecture/Lab	4
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOA 355 Watersheds in Global Development	4
BIOL 351 Genetics	3
BIOA 362 Environmental Applications for Geographic Information	
Systems (GIS)	4
BIOL 364 Ecology Laboratory	1
Choose 1 from	4
BIOL 355/357 Microbiology <i>or</i> BIOL 370 Field Biology <i>or</i>	
BIOL 380 General Mammalogy <i>or</i> BIOL 403 Marine	
Biology <i>or</i> BIOL 481 Plant Systematics	
TOTAL	24
BIOLOGY/BUSINESS Track (BIOB)	
BIOL 221/223 Animal Biology Lecture/Lab <i>or</i>	
BIOL 222/224 Plant Biology Lecture/Lab	4
BIOL 312 Cell Biology	3
BIOA <i>or</i> BIOL Selections: 21 hours of which 17 hours are 300-499	21
TOTAL	3428
Course offered at Au Sable Institute. Travel to site required.	

	SUPPLEMENT FOR MAJOR	
	(BIO) Chemistry	
	CHEM 133 General Chemistry I	
	 (3)	
	CHEM 131 General Chemistry I	
	CHEM 132/134 General	
ry II Lecture/Lab	CHEM 221/223 Organic	
ry I Lecture/Lab	CHEM 322/324 Organic	
ry II Lecture/Lab	Physics	
	PHYS 110/111 General Physics I	
Lab	PHYS 112/113 General Physics II	
Lab		
	SUPPLEMENT FOR MAJOR	
	(BIO) Chemistry	
	CHEM 133 General Chemistry I	
	 (3)	
	CHEM 131 General Chemistry I	
	CHEM 132/134 General	
ry II Lecture/Lab	College of Business	
	Administration	
:10 Financial Accounting		
Financial Management		
	MGMT 330 Management and	
ational Behavior		
	MKTG 320 Principles of	
	Marketing or	
G 343 Personal Selling		
	Mathematics	
	MATH 124 Precalculus II or	

SUPPLEMENT FOR MAJOR (BIOV)	
Animal Science	
ANSC 336 Animal Nutrition	3
Chemistry	
CHEM 133 General Chemistry I	(3)
CHEM 131 General Chemistry I Lab	1
CHEM 132/134 General Chemistry II Lecture/Lab	4
CHEM 221/223 Organic Chemistry I Lecture/Lab	4
CHEM 322/324 Organic Chemistry II Lecture/Lab	4
Physics	
PHYS 110/111 General Physics I Lecture/Lab	4
PHYS 112/113 General Physics II Lecture/Lab	4
Mathematics	
MATH 131 Calculus for Application	
or MATH 185 Calculus I	(3)
MATH 377 Statistical Methods I	3
Psychology	
PSYC 120 Introduction to Psychology	(3)
Writing	
ENGL 326 Business & Professional Writing	3
TOTAL	30
(Hours in parentheses may also fulfill university requirements and are not included in total major hours)	
SUPPLEMENT FOR MAJOR (BIOW)	
Environmental Science	
ENVR 345 Rangeland Plants	3
ENVR 410 Environmental Law	3
ENVR 420 Environmental Thought	3
ENVR 455 Wildlife Management Techniques	3
Chemistry	
CHEM 133 General Chemistry I	(3)
CHEM 131 General Chemistry I Lab	1
CHEM 114 Introductory Organic and Biological Chemistry	3
Physics	
PHYS 110/111 General Physics I Lecture/Lab	4
Mathematics	
MATH 124 Precalculus II or MATH 131 Calculus for Application or MATH 185 Calculus I	(3)
Social Sciences	
Choose 2 (in different disciplines) from	(6)
ECON 260 Principles of Macroeconomics or ECON 261 Principles of Microeconomics or GLST 120 Introduction to Global Issues or HIST 117 Civilization I or HIST 118 Civilization II or HIST 131 World History: Cultures and Connections since 1400 or HIST 221 American History I or HIST 222 American History II or HIST 250 Introduction to American Ethnic and Women's Studies or POLS 221 Government and Business or POLS 225 National Government or POLS 226 States and Federal System or POLS 227 Introduction to International Relations or PSYC 120 Introduction to Psychology or SOCI 111 Introduction to Sociology	
Writing	
ENGL 327 Scientific and Technical Writing	3
TOTAL	23
(Hours in parentheses may also fulfill university requirements and are not included in total major hours)	
SUPPLEMENT FOR MAJOR (BIOE)	
Environmental Science	
ENVR 345 Rangeland Plants	3
ENVR 410 Environmental Law	3
Chemistry	
CHEM 133 General Chemistry I	(3)
CHEM 131 General Chemistry I Lab	1
CHEM 132/134 General Chemistry II Lecture/Lab	4
CHEM 221/223 Organic Chemistry I Lecture/Lab	4
CHEM 322/324 Organic Chemistry II Lecture/Lab	4
Physics	
PHYS 110/111 General Physics I Lecture/Lab	4
PHYS 112/113 General Physics II Lecture/Lab	4
Mathematics	
MATH 124 Precalculus II or MATH 131 Calculus for Application or MATH 185 Calculus I	(3)
Writing	
ENGL 327 Scientific and Technical Writing	3
TOTAL	30
(Hours in parentheses may also fulfill university requirements and are not included in total major hours)	

ELECTIVES		
Minimum (BICM, BIOG, BIOH, BIOO)		9
Minimum (BIOV)		10
Minimum (BIOW)		3
Minimum (BIOE)		7
Minimum (BIOB)		13
TOTAL MAJOR HOURS		72
OTHER GRADUATION REQUIREMENTS		
Minimum GPA in major		
Minimum GPA for graduation		
2.00		
2.00		
advanced hours		33
total hours		128
Courses		