

BIOLOGY, B.S.

The B.S. in Biology degree prepares students for a variety of careers following graduation. Substantial numbers of students go on to health professional schools to study medicine, dentistry, pharmacy, optometry, podiatric medicine, and veterinary medicine. Other students go on to various graduate programs in the basic biological sciences (e.g., physiology, genetics, molecular biology, immunology, microbiology, marine biology, ecology, etc.), college teaching, and positions in industry and in research and development.

Student learning outcomes for the B.S. degree in Biology:

- Demonstrate knowledge of the evolution of biological systems
- Demonstrate knowledge of the structure and function of biological systems
- Demonstrate knowledge of information flow, exchange, and storage in biological systems
- Demonstrate knowledge of pathways and transformations of energy and matter in biological systems
- Demonstrate knowledge of the interconnections and interactions in biological systems
- Be able to apply the scientific method to solve problems in biology
- Effectively communicate biological concepts in written and oral forms
- Have experience using field and laboratory skills
- Apply computational and quantitative methods to describe biological systems

Major Requirements

Code	Title	Semester Hours
Lower Division Requirements		
BIOL 101	General Biology I ¹	3
BIOL 102	General Biology II ¹	3
BIOL 111	General Biology I Lab ¹	2
BIOL 112	General Biology II Lab ¹	2
BIOL 190	First Year Biology Seminar	0
BIOL 201	Cell Function ¹	3
BIOL 202	Genetics ¹	3
CHEM 110	General Chemistry I ¹	3
CHEM 111	General Chemistry I Lab ¹	1
CHEM 112	General Chemistry II ¹	3
CHEM 113	General Chemistry II Lab ¹	1
CHEM 220	Organic Chemistry I	3
CHEM 221	Organic Chemistry I Lab	1
CHEM 222	Organic Chemistry II	3
CHEM 223	Organic Chemistry II Lab	1
MATH 122	Calculus for the Life Sciences I ^{1,2}	3
MATH 123	Calculus for the Life Sciences II ²	3-4
or MATH 205	Applied Statistics	
PHYS 2500	General Physics I	4
PHYS 2550	General Physics II	4
Subtotal		46-47

Upper Division Requirements

27 (B.S.) upper division semester hours in Biology, to be selected from the groups listed below, and include at least 7 lecture and 4 laboratory courses (these may include lecture/lab combinations, which are 4 semester hours, and) a 2-semester-hour seminar or research course.

Select one of the following Cell/Organism Function courses: ³		3-4
BIOL 335	Comparative Anatomy	
BIOL 340	Embryology	
BIOL 343	Developmental Biology	
BIOL 351	General Physiology	
BIOL 353	Plant Physiology	
BIOL 355	Plants, Pharmacy, and Medicine	
BIOL 356	Cell Biology	
BIOL 357	Comparative Animal Physiology	
BIOL 358	Hormones and Behavior	
BIOL 440	Molecular Neurobiology	
BIOL 445	Endocrinology	
BIOL 446	Behavioral Endocrinology	
BIOL 449	Immunology	
BIOL 450	Physiology of Disease	
BIOL 456	Molecular Cell Biology and Lab	
BIOL 459	Stem Cell Biology	
Select one of the following Molecular Biology courses: ³		3-4
BIOL 330	Embryology and Development	
BIOL 343	Developmental Biology	
BIOL 356	Cell Biology	
BIOL 367	Biological Databases	
BIOL 370	Plant Biotechnology	
BIOL 375	Advanced Genetics	
BIOL 388	Biomathematical Modeling	
BIOL 437	Plant Development	
BIOL 439	Molecular Biology Applications	
BIOL 440	Molecular Neurobiology	
BIOL 443	Molecular Biology	
BIOL 456	Molecular Cell Biology and Lab	
BIOL 459	Stem Cell Biology	
BIOL 478	Molecular Biology of the Genome	
BIOL 479	Molecular Mechanisms of Disease	
Select one of the following Organismal Diversity courses: ³		3-4
BIOL 311	Plant Interactions	
BIOL 312	Field Botany	
BIOL 314	Tropical Ecology	
BIOL 319	Coastal Ecology	
BIOL 328	Tropical Marine Ecology	
BIOL 333	Biology of Mammals	
BIOL 334	Invertebrate Zoology	
BIOL 335	Comparative Anatomy	
BIOL 338	Animal Behavior	
BIOL 355	Plants, Pharmacy, and Medicine	
BIOL 361	General Microbiology	
BIOL 422	Marine Biology	
BIOL 460	Environmental Microbiology	

Select one of the following Populations courses: ³	3-4	Select one two-semester-hour 500-level seminar or research course	2
BIOL 304	Biostatistical Analysis	Select three additional upper division biology courses ⁵	12
BIOL 309	Applied Plant Ecology	Select one of the following plant biology courses:	3-4
BIOL 314	Tropical Ecology	BIOL 309	Applied Plant Ecology
BIOL 315	World Vegetation Ecology	BIOL 311	Plant Interactions
BIOL 316	Island Biology	BIOL 312	Field Botany ⁶
BIOL 318	Principles of Ecology	BIOL 315	World Vegetation Ecology
BIOL 319	Coastal Ecology	BIOL 353	Plant Physiology
BIOL 321	Urban Ecology	BIOL 355	Plants, Pharmacy, and Medicine
BIOL 328	Tropical Marine Ecology	BIOL 370	Plant Biotechnology
BIOL 338	Animal Behavior	BIOL 437	Plant Development
BIOL 422	Marine Biology	Select one of the following field biology courses:	1-4
BIOL 423	Marine Conservation Biology	BIOL 312	Field Botany ⁶
BIOL 472	Epidemiology	BIOL 314	Tropical Ecology
BIOL 474	Principles of Evolution	BIOL 318	Principles of Ecology
BIOL 475	Evolution	BIOL 322	Urban Ecology Lab
BIOL 477	Conservation Genetics	BIOL 325	Avian Biology Lab
Select four of the following laboratory courses: ^{3,4}	4-16	BIOL 327	Quantifying Biodiversity Field Laboratory
BIOL 312	Field Botany	BIOL 328	Tropical Marine Ecology
BIOL 314	Tropical Ecology	BIOL 333	Biology of Mammals
BIOL 318	Principles of Ecology	BIOL 338	Animal Behavior
BIOL 322	Urban Ecology Lab	BIOL 380	Tropical Marine Ecology Laboratory
BIOL 325	Avian Biology Lab	BIOL 422	Marine Biology
BIOL 327	Quantifying Biodiversity Field Laboratory	BIOL 424	Marine Physiology Laboratory
BIOL 330	Embryology and Development	BIOL 475	Evolution
BIOL 333	Biology of Mammals	Subtotal	34-54
BIOL 334	Invertebrate Zoology	Total Semester Hours	80-101
BIOL 335	Comparative Anatomy	1	
BIOL 338	Animal Behavior	A student must complete with a C (2.0) average the lower division requirements indicated by asterisks, including a C (2.0) average in BIOL 101 General Biology I, BIOL 102 General Biology II, BIOL 111 General Biology I Lab, BIOL 112 General Biology II Lab, BIOL 201 Cell Function, and BIOL 202 Genetics, prior to becoming eligible to take any upper division biology course.	
BIOL 341	Embryology Lab	2	
BIOL 344	Developmental Biology Lab	MATH 131 Calculus I, MATH 132 Calculus II may be substituted for MATH 122 Calculus for the Life Sciences I, MATH 123 Calculus for the Life Sciences II	
BIOL 352	General Physiology Lab	3	
BIOL 354	Plant Physiology Laboratory	Classes above can only satisfy ONE area, even if listed in more than one.	
BIOL 358	Hormones and Behavior	4	
BIOL 359	Cell Biology Laboratory	CHEM 371 Biochemistry Lab can be used to count as an upper division biology lab in the major. Students who are minoring or majoring in biochemistry cannot use CHEM 371 Biochemistry Lab to count as credit in both the biochemistry major/minor and biology major.	
BIOL 360	Comparative Animal Physiology Laboratory		
BIOL 362	General Microbiology Laboratory		
BIOL 363	Microbial Genomics Laboratory		
BIOL 364	Cell Culture Laboratory		
BIOL 368	Bioinformatics Laboratory		
BIOL 371	Protein Biotechnology Lab		
BIOL 376	Genetics Laboratory		
BIOL 380	Tropical Marine Ecology Laboratory		
BIOL 381	Baja Marine Ecology Laboratory		
BIOL 422	Marine Biology		
BIOL 424	Marine Physiology Laboratory		
BIOL 438	Plant Development Laboratory		
BIOL 439	Molecular Biology Applications		
BIOL 456	Molecular Cell Biology and Lab		
BIOL 475	Evolution		
BIOL 477	Conservation Genetics		
BIOL 478	Molecular Biology of the Genome		

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CHEM 370 Biochemistry and/or HSEG 515 Healthcare Delivery Systems can be used to count as an upper division biology elective in the major. If neither or only one of those is taken, one other upper division non-biology course can be used to count as an upper division biology elective in the major.

Students who wish to take a non-biology course (besides CHEM 370 Biochemistry or HSEG 515 Healthcare Delivery Systems) for upper division biology elective credit must receive approval from the chairperson of the biology department prior to taking the course. Students who are minoring or majoring in biochemistry cannot use CHEM 370 Biochemistry to count as credit in both the biochemistry major/minor and biology major.

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BIOL 312 Field Botany can satisfy only one of these two categories (either plant or field, not both).

Note:

Upper division biology courses that are taken to fulfill requirements for a different major or minor may not be used to fulfill biology major course requirements.

Upper division biology courses may be taken as electives. Students preparing for specific graduate careers should discuss appropriate courses with their advisors.

To graduate as a biology major, a student must accumulate a C (2.0) average in all major requirements.

B.S. Degree—Biology Curriculum

(124 S.H.)¹

Course	Title	Semester Hours
First Year		
Fall		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	2
BIOL 190	First Year Biology Seminar	0
CHEM 110	General Chemistry I	3
CHEM 111	General Chemistry I Lab	1
MATH 122	Calculus for the Life Sciences I ²	3
FFYS 1000 or RHET 1000	First Year Seminar or Rhetorical Arts	4
ORNT 1000	First Year Forum	0
Semester Hours		16
Spring		
BIOL 102	General Biology II	3
BIOL 112	General Biology II Lab	2
CHEM 112	General Chemistry II	3
CHEM 113	General Chemistry II Lab	1
MATH 123 or MATH 205	Calculus for the Life Sciences II or Applied Statistics	3-4
RHET 1000 or FFYS 1000	Rhetorical Arts or First Year Seminar	3-4
Semester Hours		15-17
Sophomore Year		
Fall		
BIOL 201	Cell Function	3
CHEM 220	Organic Chemistry I	3
CHEM 221	Organic Chemistry I Lab	1
University Core		4

University Core		4
Semester Hours		15
Spring		
BIOL 202	Genetics	3
CHEM 222	Organic Chemistry II	3
CHEM 223	Organic Chemistry II Lab	1
University Core		4
University Core		4
Semester Hours		15
Junior Year		
Fall		
BIOL Upper Division		4
PHYS 2500	General Physics I ³	4
University Core		4
Select one of the following:		4
University Core		
Elective ⁴		
Semester Hours		16
Spring		
BIOL Upper Division		4
BIOL Upper Division		3
PHYS 2550	General Physics II	4
University Core		4
Semester Hours		15
Senior Year		
Fall		
BIOL Upper Division		4
BIOL Upper Division		3
BIOL Seminar or Research		2
Upper Division Elective		3
Upper Division Elective		4
Semester Hours		16
Spring		
BIOL Upper Division		4
BIOL Upper Division		3
Upper Division Elective		3
Elective		3
Elective		3
Semester Hours		16
Minimum Semester Hours		124-126

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A minimum of 124 semester hours including 45 upper division hours are required to complete the degree.

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The course sequence in Mathematics depends on the results of the Mathematics Placement Exam.

3

Students who have completed MATH 122 Calculus for the Life Sciences I or MATH 131 Calculus I may begin the physics sequence in the Fall semester of either the sophomore or junior year.

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A minimum of 32 core semester hours are required. The sequence of the University Core courses should be discussed with the student's advisor.