

Biology Degree Requirements 2015-2016

Biology Major at Iowa State University

Have Questions About the Biology Minor?
Visit Student Services in 103 Bessey Hall
or call 515-294-1064

Obtaining a Bachelor of Science degree in biology at Iowa State University requires the completion of 120 credits total. Up to 65 semester hours (97 quarter hours) earned at two-year colleges can be applied, as can courses taken at other 4-year institutions. All students must maintain a 2.0 or higher cumulative grade point average (GPA) to complete a degree. The final 32 credits of coursework must be taken at Iowa State.

Students are ultimately responsible for all issues concerning the satisfactory completion of degree requirements, and should be aware that many professions require specific courses that may go above and beyond the minimum degree requirements of the Biology Program.

University Requirements

Course #	Course Name	Credits	
ENGL 150	Critical Thinking and Communication	3	FYI... A grade of C or higher is required in ENGL 150, ENGL 250, and the advanced communications course.
ENGL 250	Written, Oral, Visual, and Electronic Composition	3	
(variable)	Advanced Communications (determined by major/college)	3	
LIB 160	Information Literacy	1	International Perspectives and U.S. Diversity are frequently double-counted with college-level degree requirements
(variable)	International Perspectives	3	
(variable)	U.S. Diversity	3	

Additional information about University requirements can be found at (<http://catalog.iastate.edu/collegescurricula/>); details about English requirements, including test-out and placement, at (<http://www.engl.iastate.edu/isucomm/>); and lists of approved courses that meet International Perspectives and U.S. Diversity at (<http://www.registrar.iastate.edu/students/div-ip-guide>).

College Requirements

Students may major in biology either through the College of Liberal Arts and Sciences (LAS) or the College of Agriculture and Life Sciences (AgLS). The differences in requirements are as follows:

	LAS Requirement	AgLS Requirement
Foreign Language	101/102 college level -or- 3+ years in high school	none required
Advanced Comm.	writing (ENGL 302 to 316) or speech (SP CM 212)	speech (SP CM 212)
Math	mathematics and/or statistics	mathematics AND statistics
Science	natural sciences	biological and physical sciences
Arts & Humanities	12 credits (~4 courses)	3 credits (~1 course)
Social Sciences	9 credits (~3 courses)	3 credits (~1 course)
Ethics	none required	3 credits (~1 course)

LAS also requires 45 credits of 300-level coursework, all but 7 of which are met by completing minimum requirements of the biology major. Lists of approved courses that meet the general education requirements for the two colleges can be found at: (<http://www.las.iastate.edu/students/academics/general-education/>) and (http://www.agstudent.iastate.edu/student_services.php) for LAS and AgLS, respectively.

Biology Major Requirements

Students must have at least a 2.0 GPA for the biology core and the advanced biology areas of the major, as well as at least a C- in all classes taken in these two areas.

Biology Core

Course #	Course Name	Credits
BIOL 110 -or- BIOL 112	Introduction to Biology -or- Transfer Student Orientation	1 -or- R
BIOL 111	Opportunities in Biology	0.5
BIOL 211 & BIOL 211L	Principles of Biology I & lab	4
BIOL 212 & BIOL 212L	Principles of Biology II & lab	4
BIOL 312	Ecology (with lab)	4
BIOL 313 & BIOL 313L	Principles of Genetics & lab	4
BIOL 314	Principles of Molecular Cell Biology	3
BIOL 315	Biological Evolution	3

Advanced Biology

Select 21 credits of coursework from the approved list (see pages 3 and 4). At least 9 of these credits must be from BIOL, EEOB, or GDCB course offerings, and 2 courses must include a laboratory/field component.

Complementary or Supporting Science Requirements

Mathematics

Students must complete two semesters of calculus and/or statistics. Appropriate sequences depend on career interests and choice of college. Biology majors in LAS may opt to take calculus or statistics only, while biology majors in AgLS must take one statistics course and one math course (typically calculus).

	Mathematics Courses	Statistics Courses	Credits
<i>Statistics Only Sequence (LAS)</i>	<i>none (LAS option ONLY)</i>	STAT 101 or STAT 104, & STAT 301	7 to 8
<i>Calculus Only Sequence (LAS)</i>	MATH 165 & MATH 166, or MATH 181 & MATH 182	<i>none (LAS option ONLY)</i>	8
<i>Calc & Stat Sequence (LAS or AgLS)</i>	MATH 160, MATH 165, or MATH 181	STAT 101 or STAT 104	7 to 8
<i>Non-Calc Sequence (AgLS)</i>	any AgLS approved math	STAT 101 or STAT 104, & STAT 301	7 to 8

Chemistry

Biology majors must complete at least one semester of general chemistry (with lab), one semester of organic chemistry (with lab), and one semester of biochemistry. Several sub-disciplines of biology will require more than the minimum, and students should speak with their advisors for more information.

	General Chem	Organic Chem	Biochemistry	Credits
<i>Minimum Sequence</i>	CHEM 163 & 163L	CHEM 231 & 231L	BBMB 316	12
<i>Advanced Sequence</i>	CHEM 177 & 177L -and- CHEM 178 & 178L	CHEM 331 & 331L -and- CHEM 332 & 332L	BBMB 420 -or- BBMB 404/405	20 to 23

Physics

One semester of physics is required for biology. Some career paths may require a year of physics.

	Courses	Credits
<i>Single Semester Physics</i>	PHYS 115 & PHYS 115L	5
<i>Full Year Physics (algebra-based)</i>	PHYS 111 & PHYS 112	10
<i>Full Year Physics (calculus-based)</i>	PHYS 221 & PHYS 222	10

Approved Advanced Biology Courses

Biology Program at Iowa State University

Course offerings vary by semester; check the catalog and classes.iastate.edu

Course #	Biology Course Name	Credits	Course #	Biology Course Name	Credits
BIOL 306	Metabolic Physiology of Mammals	3	BIOL 451 •	Plant Evolution & Phylogeny	4
BIOL 328	Molecular Cell of Human Disease	3	BIOL 454 •	Plant Anatomy	4
BIOL 330	Principles of Plant Physiology	3	BIOL 455 •	Bryophyte and Lichen Biodiversity	3
BIOL 335 •	Human & Animal Physiology	4	BIOL 456	Principles of Mycology	3
BIOL 336	Ecological & Evolutionary Animal Phys	3	BIOL 457	Herpetology	2
BIOL 349	Genome Perspective in Biology	2	BIOL 457L •	Herpetology Lab	1
BIOL 350	Comprehensive Human Anatomy	3	BIOL 458	Ornithology	2
BIOL 351 •	Comparative Chordate Anatomy	5	BIOL 458L •	Ornithology Lab	1
BIOL 352 •	Vertebrate Histology	4	BIOL 459	Mammalogy	2
BIOL 353 •	Introductory Parasitology	3	BIOL 459L •	Mammalogy Lab	1
BIOL 354	Animal Behavior	3	BIOL 462	Evolutionary Genetics	3
BIOL 354L •	Animal Behavior Lab	1	BIOL 464	Wetland Ecology	3
BIOL 355	Plants and People	3	BIOL 465 •	Morphometric Analysis	4
BIOL 356 •	Dendrology	4	BIOL 471	Introduction Conservation Biology	3
BIOL 364	Invertebrate Biology	3-4	BIOL 472	Community Ecology	3
BIOL 365 •	Vertebrate Biology	4	BIOL 474	Plant Ecology	3
BIOL 366 •	Plant Systematics	4	BIOL 476	Functional Ecology	3
BIOL 370X	GIS for Ecology and Env't Science	1-6	BIOL 480 •	Studies in Marine Biology	1-8
BIOL 371 •	Ecological Methods	3	BIOL 481 •	Summer Field Studies	1-8
BIOL 381 •	Environmental Systems I	3	BIOL 482 •	Tropical Biology	1-4
BIOL 382 •	Environmental Systems II	3	BIOL 484	Ecosystem Ecology	3
BIOL 393 •	N. American Field Trips	1-4	BIOL 486	Aquatic Ecology	3
BIOL 394 •	International Field Trips	1-4	BIOL 486L •	Aquatic Ecology Lab	1
BIOL 402	Introduction to Pathology	3	BIOL 487	Microbial Ecology	3
BIOL 414	Life History & Reproductive Strategy	3	BIOL 488 •	Identification of Aquatic Organisms	1
BIOL 423	Developmental Biology	3	BIOL 489 •	Population Ecology	3
BIOL 423L •	Developmental Biology Lab	1	BIOL 490 •	Independent Study	1
BIOL 428	Topics in Cell Biology	3	BIOL 491 •	Undergraduate Teaching Experience	1-2
BIOL 434	Endocrinology	3	BIOL 494 •	Biology Internship	1-3
BIOL 436	Neurobiology	3	BIOL 495	Undergraduate Seminar (various topics)	1-3
BIOL 439 •	Environmental Physiology	3-4	BIOL 498	Cooperative Education	R
BIOL 444	Introduction to Bioinformatics	4	BIOL 499 •	Undergraduate Research	1-3

Students may apply a maximum of 7 credits of the following: BIOL 480, 481, 490 (2 cr max), 491 (2 cr max), 494, and 499 towards advanced biology. Lab courses are denoted by •. Courses below are graduate level courses open to undergraduates by prerequisite or permission and typically offered alternate semesters.

Course #	Graduate Course Name	Credits	Course #	Graduate Course Name	Credits
EEOB 507	Advanced Animal Behavior	3	EEOB 578	Foundations of Theoretical Ecol. & Evol.	3
EEOB 514	Life History and Reproductive Strategies	3	EEOB 581	Environmental Systems I	3-4
EEOB 531	Conservation Biology	3	EEOB 582	Environmental Systems II	3
EEOB 534	Endocrinology	3	EEOB 584	Advanced Ecosystem Ecology	3
EEOB 535	Restoration Ecology	3	EEOB 585	Advanced Community Ecology	3
EEOB 539	Environmental Physiology	3-4	EEOB 586	Aquatic Ecology	3
EEOB 542	Intro to Molecular Biology Techniques	1	EEOB 586L	Aquatic Ecology Lab	1
EEOB 544	Introduction to Bioinformatics	4	EEOB 587	Microbial Ecology	3
EEOB 551	Plant Evolution and Phylogeny	4	EEOB 589	Population Ecology	3
EEOB 553	Agrostology	3	EEOB 590	Special Topics	1-3
EEOB 555	Bryophyte and Lichen Biodiversity	3	EEOB 596	Ecology and Society	3
EEOB 559	Mammalogy	3	GDCB 505	Entrepreneurship in Science & Tech	3
EEOB 560	Resource Ecology	3	GDCB 510	Transmission Genetics	3
EEOB 561	Evolutionary and Ecological Genomics	3	GDCB 511	Molecular Genetics	3
EEOB 562	Evolutionary Genetics	3	GDCB 513	Plant Metabolism	2
EEOB 563	Molecular Phylogenetics	3	GDCB 528	Advances in Molecular Cell Biology	3
EEOB 564	Wetland Ecology	3	GDCB 533	Advances in Developmental Biology	3
EEOB 565	Morphometric Analysis	4	GDCB 536	Statistical Genetics	4
EEOB 566	Molecular Evolution	3	GDCB 542	Intro to Molecular Biology Techniques	1
EEOB 567	Empirical Population Genetics	3	GDCB 544	Introduction to Bioinformatics	4
EEOB 568	Advanced Systematics	3	GDCB 545	Plant Molecular, Cell and Dev't Biology	3
EEOB 569	Biogeography	3	GDCB 556	Cell, Molec, & Dev't Neuroscience	3
EEOB 570	Landscape Ecology	3	GDCB 557	Advanced Neuroscience Techniques	3
EEOB 573	Techniques for Biology Teaching	1-2	GDCB 568	Bioinformatics II	3
EEOB 576	Functional Ecology	3	GDCB 570	Bioinformatics IV	3
EEOB 577	Concepts in Theoretical Ecol. & Evol.	1	GDCB 590	Special Topics	var

This page lists approved advanced biology courses offered by other departments at Iowa State. These courses may have pre-requisites not included in this list that do not count as advanced biology courses.

<u>Agronomy Courses</u>		Credits	<u>Genetics Courses</u>		Credits
AGRON 317	Principles of Weed Science	3	GEN 340	Human Genetics	3
AGRON 338	Seed Science and Technology	3	GEN 409	Molecular Genetics	3
AGRON 354	Soils and Plant Growth	3	GEN 410	Analytical Genetics	3
AGRON 354L	Soils and Plant Growth Lab	1	<u>Horticulture Courses</u>		
AGRON 421	Introduction to Plant Breeding	3	HORT 321	Horticulture Physiology	3
AGRON 485	Soil & Environmental Microbiology	3	HORT 322	Plant Propagation	3
<u>Animal Science Courses</u>		Credits	<u>Kinesiology Courses</u>		
AN S 319	Animal Nutrition	3	KIN 355	Biomechanics	3
AN S 331	Domestic Animal Reproduction	3	KIN 363	Basic Electrocardiography	2
AN S 332	Lab Methods in Animal Reproduction	1	<u>Microbiology Courses</u>		
AN S 333	Embryo Transfer & Related Technology	3	MICRO 302	Biology of Microorganisms	3
AN S 334	Embryo Transfer Laboratory	1	MICRO 302L	Microbiology Lab	1
AN S 337	Lactation	3	MICRO 310	Medical Microbiology	3
AN S 345	Growth & Dev't of Domestic Animals	3	MICRO 310L	Medical Microbiology Lab	1
AN S 352	Genetic Improvem't of Domestic Animals	3	MICRO 320	Molecular and Cellular Bacteriology	4
AN S 419	Advanced Animal Nutrition	2	MICRO 320	Molecular and Cellular Bacteriology	4
<u>Anthropology Courses</u>		Credits	MICRO 374	Insects and Our Health	3
ANTHR 307	Biological Anthropology	3	MICRO 402	Microbial Genetics	3
ANTHR 319	Skeletal Biology	3	MICRO 408	Virology	3
ANTHR 350	Primate Behavior	3	MICRO 410	Insect-Virus Interactions	3
ANTHR 424	Forensic Anthropology	3	MICRO 475	Immunology	3
ANTHR 438	Primate Evolutionary Ecology & Behavior	3	<u>Natural Resource Ecology & Management Courses</u>		
<u>Biochemistry Courses</u>		Credits	A ECL 321	Fish Biology	3
BBMB 405	Biochemistry II	3	A ECL 366	Natural History of Iowa Vertebrates	3
BBMB 411	Techniques in Biochemical Research	4	A ECL 415	Ecol. of Freshwater Inverts/Plants/Algae	3
BBMB 420	Physiological Chemistry	3	A ECL 418	Stream Ecology	3
BBMB 430	Prokaryotic Diversity and Ecology	3	A ECL 442	Aquaculture	3
BBMB 440	Microbial Phys, Diversity, & Genetics Lab	4	A ECL 454	Principles of Wildlife Disease	3
<u>Biomedical Studies Courses</u>		Credits	FOR 302	Silviculture	3
B M S 329	Anat & Phys of Domestic Animals	3	NREM 301	Natural Resource Ecology & Soils	4
B M S 335	Molec & Cell Basis of Disease	1	NREM 345	Natural Resource Photogrammetry & GIS	3
B M S 401	Intro Aquatic Animal Medicine	1	NREM 357	Midwestern Prairie Plants	1
B M S 415	Anatomy of Laboratory Animals	2	NREM 358	Forest Herbaceous Layer	1
B M S 416	Avian Anatomy	2	NREM 390	Fire Ecology and Management	3
<u>Community & Regional Planning Courses</u>		Credits	NREM 407	Watershed Management	4
C R P 451	Introduction to GIS	3	NREM 446	Integrating GPS & GIS for Nat. Res.	3
<u>Entomology Courses</u>		Credits	NREM 452	Ecosystem Management	3
ENT 370	Insect Biology	3	<u>Plant Pathology Courses</u>		
ENT 374	Insects and our Health	3	PL P 391	Practical Plant Health	2
ENT 374L	Insects and our Health Laboratory	1	PL P 408	Principles of Plant Pathology	3
ENT 410	Insect-Virus Interactions	3	PL P 416	Forest Insects & Diseases	3
ENT 425	Aquatic Insects	3	PL P 416L	Forest Insects & Diseases Laboratory	1
ENT 471	Insect Ecology	3	PL P 477	Bacterial-Plant Interactions	3
<u>Food Science & Human Nutrition Courses</u>		Credits	PL P 494	Seed Pathology	2
FS HN 360	Adv. Human Nutrition & Metabolism	3	<u>Psychology Courses</u>		
FS HN 361	Nutrition & Health Assessment	2	PSYCH 310	Brain and Behavior	3
FS HN 364	Nutrit. & Prevention of Chronic Disease	3	PSYCH 315	Drugs and Behavior	3
FS HN 367	Medical Terminology	1			

Iowa Lakeside Laboratory – courses taken over the summer at Iowa Lakeside Lab often count towards advanced biology requirements. Please check for available courses on the Lakeside Lab web page (<http://www.continuetolearn.uiowa.edu/lakesidelab/>) and consult your advisor for those that apply to the degree program.