

# Biology Degree Requirements 2019-2020

Biology Major at Iowa State University

Have Questions About the Biology Major?  
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	FYI...
ENGL 150	Critical Thinking and Communication	3	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 (<https://www.cals.iastate.edu/student-services/home>) 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.

### 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 (LAS)</i>	<i>none (LAS option ONLY)</i>	STAT 101 or STAT 104, & STAT 301	7 to 8
<i>Calculus Only (LAS)</i>	MATH 165 & MATH 166	<i>none (LAS option ONLY)</i>	8
<i>Calc &amp; Stat (LAS or AgLS)</i>	MATH 160 or MATH 165	STAT 101 or STAT 104	7 to 8
<i>Non-Calc (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](http://classes.iastate.edu)

Course #	Biology Course Name	Credits	Course #	Biology Course Name	Credits
BIOL 322	Intro Bioinformatics and Comp. Bio	3	BIOL 451 •	Plant Evolution & Phylogeny	4
BIOL 328	Mole. & Cell. Bio of Human Disease	3	BIOL 454 •	Plant Anatomy	4
BIOL 335	Human & Animal Physiology	3	BIOL 455 •	Bryophyte and Lichen Biodiversity	3
BIOL 335L •	Human & Animal Physiology Lab	1	BIOL 456 •	Principles of Mycology	3
BIOL 336	Ecological & Evolutionary Animal Phys	3	BIOL 457	Herpetology	2
BIOL 344	Human Reproduction	3	BIOL 457L •	Herpetology Lab	1
BIOL 349 •	Genome Perspective in Biology	3	BIOL 458	Ornithology	2
BIOL 350	Comprehensive Human Anatomy	3	BIOL 458L •	Ornithology Lab	1
BIOL 351 •	Comparative Chordate Anatomy	5	BIOL 459	Mammalogy	2
BIOL 352 •	Vertebrate Histology	4	BIOL 459L •	Mammalogy Lab	1
BIOL 353 •	Introductory Parasitology	3	BIOL 462	Evolutionary Genetics	3
BIOL 354	Animal Behavior	3	BIOL 464	Wetland Ecology	3
BIOL 354L •	Animal Behavior Lab	1	BIOL 465	Macroevolution	3
BIOL 355	Plants and People	3	BIOL 471	Introductory Conservation Biology	3
BIOL 356 •	Dendrology	4	BIOL 472	Community Ecology	3
BIOL 357	Biology of Plants	3	BIOL 474	Plant Ecology	3
BIOL 364	Invertebrate Biology	3-4	BIOL 476	Functional Ecology	3
BIOL 365 •	Vertebrate Biology	4	BIOL 480 •	Studies in Marine Biology	1-8
BIOL 366 •	Plant Systematics	4	BIOL 481 •	Summer Field Studies	1-8
BIOL 370 •	GIS for Ecology and Env't Science	1-6	BIOL 482 •	Tropical Biology	1-4
BIOL 371 •	Ecological Methods	3	BIOL 483X	Environmental Biogeochemistry	3
BIOL 381	Environmental Systems I	3	BIOL 484	Ecosystem Ecology	3
BIOL 382 •	Environmental Systems II	3	BIOL 486	Aquatic Ecology	3
BIOL 393 •	N. American Field Trips	1-4	BIOL 486L •	Aquatic Ecology Lab	1
BIOL 394 •	International Field Trips	1-4	BIOL 487	Microbial Ecology	3
BIOL 402	Introduction to Pathology	3	BIOL 488 •	Identification of Aquatic Organisms	1
BIOL 414	Life History & Reproductive Strategy	3	BIOL 489 •	Population Ecology	3
BIOL 423	Developmental Biology	3	BIOL 490	Independent Study	1
BIOL 423L •	Developmental Biology Lab	1	BIOL 491 •	Undergraduate Teaching Experience	1-2
BIOL 428	Topics in Cell Biology	3	BIOL 492	Preparing for Grad School in Biology	1
BIOL 430	Principles of Plant Physiology	3	BIOL 494 •	Biology Internship	1-3
BIOL 434	Endocrinology	3	BIOL 495	Undergraduate Seminar (various topics)	1-3
BIOL 436	Neurobiology	3	BIOL 498	Cooperative Education	R
BIOL 444	Bioinformatic Analysis	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 585	Advanced Community Ecology	3
EEOB 514	Life History and Reproductive Strategies	3	EEOB 586	Aquatic Ecology	3
EEOB 531	Conservation Biology	3	EEOB 586L •	Aquatic Ecology Lab	1
EEOB 534	Endocrinology	3	EEOB 587	Microbial Ecology	3
EEOB 535 •	Restoration Ecology	3	EEOB 589 •	Population Ecology	3
EEOB 551 •	Plant Evolution and Phylogeny	4	EEOB 590	Special Topics	1-3
EEOB 553	Agrostology	3	EEOB 596	Ecology and Society	3
EEOB 555 •	Bryophyte and Lichen Biodiversity	3	GDCB 505	Entrepreneurship in Science & Tech	3
EEOB 558	Ornithology	2	GDCB 510	Transmission Genetics	3
EEOB 559	Mammalogy	2	GDCB 511	Molecular Genetics	3
EEOB 561	Evolutionary and Ecological Genomics	3	GDCB 513	Plant Metabolism	2
EEOB 562	Evolutionary Genetics	3	GDCB 528	Advances in Molecular Cell Biology	3
EEOB 563	Molecular Phylogenetics	3	GDCB 533	Advances in Developmental Biology	3
EEOB 564	Wetland Ecology	3	GDCB 536	Statistical Genetics	4
EEOB 565	Macroevolution	3	GDCB 542 •	Intro to Molecular Biology Techniques	1
EEOB 566	Molecular Evolution	3	GDCB 544	Fundamentals of Bioinformatics	4
EEOB 567	Empirical Population Genetics	3	GDCB 545	Plant Molecular, Cell and Dev't Biology	3
EEOB 568 •	Advanced Systematics	3	GDCB 556	Cell, Molec. & Dev't Neuroscience	3
EEOB 569	Biogeography	3	GDCB 557	Advanced Neuroscience Techniques	3
EEOB 573	Techniques for Biology Teaching	1-2	GDCB 568	Bioinformatics II (Statistical)	3
EEOB 576	Functional Ecology	3	GDCB 569	Bioinformatics III (Structural)	3
EEOB 577	Concepts in Theoretical Ecol. & Evol.	1	GDCB 570	Bioinformatics IV (Systems Biology)	3
EEOB 581	Environmental Systems I	3-4	GDCB 585	Fund. of Predictive Plant Phenomics	4
EEOB 582 •	Environmental Systems II	3	GDCB 590	Special Topics	var
EEOB 584	Advanced Ecosystem Ecology	3			

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.

<b><u>Agronomy Courses</u></b>		<b>Credits</b>	<b><u>Genetics Courses</u></b>		<b>Credits</b>
AGRON 316	Crop Structure-Function Relationships	3	GEN 340	Human Genetics	3
AGRON 317	Principles of Weed Science	3	GEN 409	Molecular Genetics	3
AGRON 338 •	Seed Science and Technology	3	GEN 410	Analytical Genetics	3
AGRON 354	Soils and Plant Growth	3	<b><u>Health Studies Courses</u></b>		
AGRON 354L •	Soils and Plant Growth Lab	1	<b>Credits</b>		
AGRON 421	Introduction to Plant Breeding	3	H S 350	Human Diseases	3
AGRON 485 •	Soil & Environmental Microbiology	3	<b><u>Horticulture Courses</u></b>		
<b><u>Animal Science Courses</u></b>			<b>Credits</b>		
AN S 313	Exercise Physiology of Animals	2	HORT 321	Horticulture Physiology	3
AN S 319	Animal Nutrition	3	HORT 322 •	Plant Propagation	3
AN S 331	Domestic Animal Reproduction	3	<b><u>Kinesiology Courses</u></b>		
AN S 332 •	Lab Methods in Animal Reproduction	1	<b>Credits</b>		
AN S 333	Embryo Transfer & Related Technology	3	KIN 355	Biomechanics	3
AN S 334 •	Embryo Transfer Laboratory	1	KIN 363	Basic Electrocardiography	2
AN S 337	Lactation	3	KIN 472	Neural Basis of Human Movement	3
AN S 345	Growth & Dev't of Domestic Animals	3	<b><u>Microbiology Courses</u></b>		
AN S 352 •	Genetic Improvem't of Domestic Animals	3	<b>Credits</b>		
AN S 419	Advanced Animal Nutrition	2	MICRO 302	Biology of Microorganisms	3
<b><u>Anthropology Courses</u></b>			MICRO 302L •	Microbiology Lab	1
<b>Credits</b>			MICRO 310	Medical Microbiology	3
ANTHR 307 •	Biological Anthropology	3	MICRO 310L •	Medical Microbiology Lab	1
ANTHR 319 •	Skeletal Biology	3	MICRO 320	Molecular and Cellular Bacteriology	4
ANTHR 424 •	Forensic Anthropology	3	MICRO 402	Microbial Genetics	3
ANTHR 438	Primate Evolutionary Ecology & Behavior	3	MICRO 408	Virology	3
ANTHR 482	Topics in Biological Anthropology	3	MICRO 475	Immunology	3
<b><u>Biochemistry Courses</u></b>			MICRO 475L •	Immunology Laboratory	1
<b>Credits</b>			<b><u>Natural Resource Ecology &amp; Management Courses</u></b>		
BBMB 405	Biochemistry II	3	<b>Credits</b>		
BBMB 411 •	Techniques in Biochemical Research	4	A ECL 321 •	Fish Biology	3
BBMB 420	Mammalian Biochemistry	3	A ECL 366 •	Natural History of Iowa Vertebrates	3
BBMB 430	Prokaryotic Diversity and Ecology	3	A ECL 415 •	Ecol. of Freshwater Inverts/Plants/Algae	3
BBMB 440 •	Microbial Phys, Diversity, & Genetics Lab	4	A ECL 418 •	Stream Ecology	3
<b><u>Biomedical Studies Courses</u></b>			A ECL 442	Aquaculture	3
<b>Credits</b>			A ECL 454	Principles of Wildlife Disease	3
B M S 329	Anat & Phys of Domestic Animals	3	FOR 302 •	Silviculture	3
B M S 335	Molec & Cell Basis of Disease	1	NREM 301 •	Natural Resource Ecology & Soils	4
B M S 401 •	Intro Aquatic Animal Medicine	1	NREM 345 •	Natural Resource Photogrammetry & GIS	3
<b><u>Community &amp; Regional Planning Courses</u></b>			NREM 357 •	Midwestern Prairie Plants	1
<b>Credits</b>			NREM 358 •	Forest Herbaceous Layer	1
C R P 451 •	Introduction to GIS	3	NREM 390	Fire Ecology and Management	3
<b><u>Entomology Courses</u></b>			NREM 407 •	Watershed Management	4
<b>Credits</b>			NREM 446 •	Integrating GPS & GIS for Nat. Res.	3
ENT 370 •	Insect Biology	3	NREM 452 •	Ecosystem Management	3
ENT 374	Insects and our Health	3	<b><u>Plant Pathology Courses</u></b>		
ENT 374L •	Insects and our Health Laboratory	1	<b>Credits</b>		
ENT 375	Plant Protection Using Natural Enemies	3	PL P 408	Principles of Plant Pathology	3
ENT 425 •	Aquatic Insects	3	PL P 416	Forest Insects & Diseases	3
ENT 471 •	Insect Ecology	3	PL P 416L •	Forest Insects & Diseases Laboratory	1
<b><u>Food Science &amp; Human Nutrition Courses</u></b>			PL P 477	Bacterial-Plant Interactions	3
<b>Credits</b>			PL P 494	Seed Pathology	2
FS HN 360	Adv. Human Nutrition & Metabolism	3	<b><u>Psychology Courses</u></b>		
FS HN 361 •	Nutrition & Health Assessment	2	<b>Credits</b>		
FS HN 362	Nutrition in Growth and Development	3	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.