Biology Degree Requirements 2016-2017

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
ENGL 250	Written, Oral, Visual, and Electronic Composition	3
(variable)	Advanced Communications (determined by major/college)	3
LIB 160	Information Literacy	1
(variable)	International Perspectives	3
(variable)	U.S. Diversity	3

FYI…

A grade of C or higher is required in ENGL 150, ENGL 250, and the advanced communications course.

International Perspectives and U.S. Diversity are frequently double-counted with college-level degree requirements

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
Statistics Only Sequence (LAS)	*none (LAS option **ONLY**)*	STAT 101 or STAT 104, & STAT 301	7 to 8
Calculus Only Sequence (LAS)	MATH 165 & MATH 166, or MATH 181 & MATH 182	*none (LAS option **ONLY**)*	8
Calc & Stat Sequence (LAS or AgLS)	MATH 160, MATH 165, or MATH 181	STAT 101 or STAT 104	7 to 8
Non-Calc Sequence (AgLS)	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
Minimum Sequence	CHEM 163 & 163L	CHEM 231 & 231L	BBMB 316	12
Advanced Sequence	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
Single Semester Physics	PHYS 115 & PHYS 115L	5
Full Year Physics (algebra-based)	PHYS 111 & PHYS 112	10
Full Year Physics (calculus-based)	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
BIOL 322	Intro Bioinformatics and Comp. Bio	3
BIOL 328	Molecular Cell of Human Disease	3
BIOL 334	Metabolic Physiology of Mammals	3
BIOL 335 •	Human & Animal Physiology	4
BIOL 336	Ecological & Evolutionary Animal Phys	3
BIOL 349	Genome Perspective in Biology	2
BIOL 350	Comprehensive Human Anatomy	3
BIOL 351 •	Comparative Chordate Anatomy	5
BIOL 352 •	Vertebrate Histology	4
BIOL 353 •	Introductory Parasitology	3
BIOL 354	Animal Behavior	3
BIOL 354L •	Animal Behavior Lab	1
BIOL 355	Plants and People	3
BIOL 356 •	Dendrology	4
BIOL 364	Invertebrate Biology	3-4
BIOL 365 •	Vertebrate Biology	4
BIOL 366 •	Plant Systematics	4
BIOL 370 •	GIS for Ecology and Env't Science	1-6
BIOL 371 •	Ecological Methods	3
BIOL 381	Environmental Systems I	3
BIOL 382 •	Environmental Systems II	3
BIOL 393 •	N. American Field Trips	1-4
BIOL 394 •	International Field Trips	1-4
BIOL 402	Introduction to Pathology	3
BIOL 414	Life History & Reproductive Strategy	3
BIOL 423	Developmental Biology	3
BIOL 423L •	Developmental Biology Lab	1
BIOL 428	Topics in Cell Biology	3
BIOL 430	Principles of Plant Physiology	3
BIOL 434	Endocrinology	3
BIOL 436	Neurobiology	3
BIOL 439	Environmental Physiology	3-4
BIOL 444	Introduction to Bioinformatics	4

Course #	Biology Course Name	Credits
BIOL 451 •	Plant Evolution & Phylogeny	4
BIOL 454 •	Plant Anatomy	4
BIOL 455 •	Bryophyte and Lichen Biodiversity	3
BIOL 456 •	Principles of Mycology	3
BIOL 457	Herpetology	2
BIOL 457L •	Herpetology Lab	1
BIOL 458	Ornithology	2
BIOL 458L •	Ornithology Lab	1
BIOL 459	Mammalogy	2
BIOL 459L •	Mammalogy Lab	1
BIOL 462	Evolutionary Genetics	3
BIOL 464	Wetland Ecology	3
BIOL 465 •	Morphometric Analysis	4
BIOL 471	Introduction Conservation Biology	3
BIOL 472	Community Ecology	3
BIOL 474	Plant Ecology	3
BIOL 476	Functional Ecology	3
BIOL 480 •	Studies in Marine Biology	1-8
BIOL 481 •	Summer Field Studies	1-8
BIOL 482 •	Tropical Biology	1-4
BIOL 484	Ecosystem Ecology	3
BIOL 486	Aquatic Ecology	3
BIOL 486L •	Aquatic Ecology Lab	1
BIOL 487	Microbial Ecology	3
BIOL 488 •	Identification of Aquatic Organisms	1
BIOL 489 •	Population Ecology	3
BIOL 490	Independent Study	1
BIOL 491 •	Undergraduate Teaching Experience	1-2
BIOL 492	Preparing for Grad School in Biology	1
BIOL 494 •	Biology Internship	1-3
BIOL 495	Undergraduate Seminar (various topics)	1-3
BIOL 498	Cooperative Education	R
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
EEOB 507	Advanced Animal Behavior	3
EEOB 514	Life History and Reproductive Strategies	3
EEOB 531	Conservation Biology	3
EEOB 534	Endocrinology	3
EEOB 535	Restoration Ecology	3
EEOB 539	Environmental Physiology	3-4
EEOB 542	Intro to Molecular Biology Techniques	1
EEOB 544	Introduction to Bioinformatics	4
EEOB 551	Plant Evolution and Phylogeny	4
EEOB 553	Agrostology	3
EEOB 555	Bryophyte and Lichen Biodiversity	3
EEOB 559	Mammalogy	3
EEOB 560	Resource Ecology	3
EEOB 561	Evolutionary and Ecological Genomics	3
EEOB 562	Evolutionary Genetics	3
EEOB 563	Molecular Phylogenetics	3
EEOB 564	Wetland Ecology	3
EEOB 565	Morphometric Analysis	4
EEOB 566	Molecular Evolution	3
EEOB 567	Empirical Population Genetics	3
EEOB 568	Advanced Systematics	3
EEOB 569	Biogeography	3
EEOB 570	Landscape Ecology	3
EEOB 573	Techniques for Biology Teaching	1-2
EEOB 576	Functional Ecology	3
EEOB 577	Concepts in Theoretical Ecol. & Evol.	1

Course #	Graduate Course Name	Credits
EEOB 578	Foundations of Theoretical Ecol. & Evol.	3
EEOB 581	Environmental Systems I	3-4
EEOB 582	Environmental Systems II	3
EEOB 584	Advanced Ecosystem Ecology	3
EEOB 585	Advanced Community Ecology	3
EEOB 586	Aquatic Ecology	3
EEOB 586L	Aquatic Ecology Lab	1
EEOB 587	Microbial Ecology	3
EEOB 589	Population Ecology	3
EEOB 590	Special Topics	1-3
EEOB 596	Ecology and Society	3
GDCB 505	Entrepreneurship in Science & Tech	3
GDCB 510	Transmission Genetics	3
GDCB 511	Molecular Genetics	3
GDCB 513	Plant Metabolism	2
GDCB 528	Advances in Molecular Cell Biology	3
GDCB 533	Advances in Developmental Biology	3
GDCB 536	Statistical Genetics	4
GDCB 542	Intro to Molecular Biology Techniques	1
GDCB 544	Introduction to Bioinformatics	4
GDCB 545	Plant Molecular, Cell and Dev't Biology	3
GDCB 556	Cell, Molec, & Dev't Neuroscience	3
GDCB 557	Advanced Neuroscience Techniques	3
GDCB 568	Bioinformatics II	3
GDCB 570	Bioinformatics IV	3
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.

Agronomy Courses		Credits
AGRON 317	Principles of Weed Science	3
AGRON 338	Seed Science and Technology	3
AGRON 354	Soils and Plant Growth	3
AGRON 354L	Soils and Plant Growth Lab	1
AGRON 421	Introduction to Plant Breeding	3
AGRON 485	Soil & Environmental Microbiology	3

Animal Science Courses		Credits
AN S 319	Animal Nutrition	3
AN S 331	Domestic Animal Reproduction	3
AN S 332	Lab Methods in Animal Reproduction	1
AN S 333	Embryo Transfer & Related Technology	3
AN S 334	Embryo Transfer Laboratory	1
AN S 337	Lactation	3
AN S 345	Growth & Dev't of Domestic Animals	3
AN S 352	Genetic Improvem't of Domestic Animals	3
AN S 419	Advanced Animal Nutrition	2

Anthropology Courses		Credits
ANTHR 307	Biological Anthropology	3
ANTHR 319	Skeletal Biology	3
ANTHR 350	Primate Behavior	3
ANTHR 424	Forensic Anthropology	3
ANTHR 438	Primate Evolutionary Ecology & Behavior	3

Biochemistry Courses		Credits
BBMB 405	Biochemistry II	3
BBMB 411	Techniques in Biochemical Research	4
BBMB 420	Physiological Chemistry	3
BBMB 430	Prokaryotic Diversity and Ecology	3
BBMB 440	Microbial Phys, Diversity, & Genetics Lab	4

Biomedical Studies Courses		Credits
B M S 329	Anat & Phys of Domestic Animals	3
B M S 335	Molec & Cell Basis of Disease	1
B M S 401	Intro Aquatic Animal Medicine	1

Community & Regional Planning Courses		Credits
C R P 451	Introduction to GIS	3

Entomology Courses		Credits
ENT 370	Insect Biology	3
ENT 374	Insects and our Health	3
ENT 374L	Insects and our Health Laboratory	1
ENT 410	Insect-Virus Interactions	3
ENT 425	Aquatic Insects	3
ENT 471	Insect Ecology	3

Food Science & Human Nutrition Courses		Credits
FS HN 360	Adv. Human Nutrition & Metabolism	3
FS HN 361	Nutrition & Health Assessment	2
FS HN 364	Nutrit. & Prevention of Chronic Disease	3
FS HN 367	Medical Terminology	1

Genetics Courses		Credits
GEN 340	Human Genetics	3
GEN 409	Molecular Genetics	3
GEN 410	Analytical Genetics	3

Horticulture Courses		Credits
HORT 321	Horticulture Physiology	3
HORT 322	Plant Propagation	3

Kinesiology Courses		Credits
KIN 355	Biomechanics	3
KIN 363	Basic Electrocardiography	2

Microbiology Courses		Credits
MICRO 302	Biology of Microorganisms	3
MICRO 302L	Microbiology Lab	1
MICRO 310	Medical Microbiology	3
MICRO 310L	Medical Microbiology Lab	1
MICRO 320	Molecular and Cellular Bacteriology	4
MICRO 402	Microbial Genetics	3
MICRO 408	Virology	3
MICRO 475	Immunology	3

Natural Resource Ecology & Management Courses		Credits
A ECL 321	Fish Biology	3
A ECL 366	Natural History of Iowa Vertebrates	3
A ECL 415	Ecol. of Freshwater Inverts/Plants/Algae	3
A ECL 418	Stream Ecology	3
A ECL 442	Aquaculture	3
A ECL 454	Principles of Wildlife Disease	3
FOR 302	Silviculture	3
NREM 301	Natural Resource Ecology & Soils	4
NREM 345	Natural Resource Photogrammetry & GIS	3
NREM 357	Midwestern Prairie Plants	1
NREM 358	Forest Herbaceous Layer	1
NREM 390	Fire Ecology and Management	3
NREM 407	Watershed Management	4
NREM 446	Integrating GPS & GIS for Nat. Res.	3
NREM 452	Ecosystem Management	3

Plant Pathology Courses		Credits
PL P 391	Practical Plant Health	2
PL P 408	Principles of Plant Pathology	3
PL P 416	Forest Insects & Diseases	3
PL P 416L	Forest Insects & Diseases Laboratory	1
PL P 477	Bacterial-Plant Interactions	3
PL P 494	Seed Pathology	2

Psychology Courses		Credits
PSYCH 310	Brain and Behavior	3
PSYCH 315	Drugs and Behavior	3

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.*