IOWA STATE UNIVERSITY
Biology Program

factsheet | **degree requirements**

Biology Degree Requirements
B.S. 2022-2023

The Bachelor of Science (B.S.) degree in biology requires a minimum of 120 credits. Up to 65 credits earned at other two-year or four-year institutions can be applied. All students must maintain a minimum 2.00 cumulative grade point average (GPA) to complete a degree. The final 32 credits of coursework must be taken at Iowa State University. The B.S. degree in biology requires the following coursework.

University Requirements

Requirement	Course Description	Credits
International Perspectives	Select course from approved International Perspectives list	3
U.S. Diversity	Select course from approved U.S. Diversity list	3
Engl 150	Critical Thinking and Communication	3
Engl 250	Written, Oral, Visual, and Electronic Composition	3
Lib 160	Information Literacy	1

Things to Know

- Students must earn a grade of C or higher in Engl 150, Engl 250, and the advanced communication course.
- Several International Perspectives and U.S. Diversity courses can double-count toward college requirements.

College Requirements

Students can major in biology either through the College of Liberal Arts & Sciences (LAS) or the College of Agriculture & Life Sciences (CALS). Both options lead to the B.S. degree in biology from Iowa State University.

Biology majors complete the same university requirements and major requirements (biology core, advanced biology, and complementary science courses) regardless of college. The differences in requirements lie in the college requirements. These differences are outlined below:

College Requirement	College of Liberal Arts & Sciences (LAS)	College of Agriculture & Life Sciences (CALS)
World Language	3+ years of same language in high school or 4-8 credits	None required
Advanced Communication	3 credits writing (Engl 302-316) or speech (Sp Cm 212)	3 credits writing (ComSt 214) or speech (Sp Cm 212)
Math	Math and/or statistics	Math and statistics
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)

NOTE: LAS also requires 45 credits of 300+ level coursework, all but 7 of which are met by completing minimum requirements for the biology major. Lists of approved courses that meet the general education requirements can be found online.

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B.S. 2022-2023

Supporting Sciences
Required coursework in mathematics, chemistry, and physics provides Biology majors with a well-rounded background in complementary sciences.

Mathematics and Statistics
Biology majors must complete at least 2 semesters of math and/or statistics. The specific requirement depends on college.

LAS Options	Course Name & Number	Credits
A) 1 semester of statistics + 1 semester of calculus	Introductory Statistics + Introductory Calculus Stat 104 or Stat 101 + Math 160 or Math 165	7-8
B) 2 semesters of statistics	Introductory Statistics + Intermediate Statistics Stat 104 or 101 + Stat 301	7-8
C) 2 semesters of calculus	Calculus I + Calculus II Math 165 + Math 166	8

CALS Options	Course Name & Number	Credits
A) 1 semester of statistics + 1 semester of calculus	Introductory Statistics + Introductory Calculus Stat 104 or Stat 101 + Math 160 or Math 165	7-8
B) 2 semesters of statistics + 1 semester of math	Introductory Statistics + Intermediate Statistics + Algebra, Pre-Calc, or Trig. Stat 104 or Stat 101 + Stat 301 + Math 140, 143, or 145	10-12

Chemistry
Biology majors must complete at least one semester of general chemistry (with lab), organic chemistry (with lab), and biochemistry. Certain career paths may require additional chemistry. Students should consult with their advisor regarding chemistry course selection.

Chemistry	1 Semester Option	Credits	2 Semester Option	Credits
General Chemistry	College Chemistry Chem 163 & 163L	5	General Chemistry I + General Chemistry II Chem 177 & 177L + Chem 178 & 178L	10
Organic Chemistry	Elementary Organic Chemistry Chem 231 & 231L	4	Organic Chemistry I + Organic Chemistry II Chem 331 & 331L + Chem 332 & 332L	8
Biochemistry	Principles of Biochemistry BBMB 316	3	Biochemistry I + Biochemistry II BBMB 404 + BBMB 405	6

Physics
Biology majors must complete at least one semester of general physics (with lab). Certain career paths may require additional physics. Students should consult with their advisor regarding physics course selection.

Physics	1 Semester Option	Credits	2 Semester Option	Credits
General Physics	Physics for the Life Sciences Phys 115 & 115L	5	General Physics I + General Physics II Phys 131 & 131L + Phys 132 & 132L	10

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Biology Major Requirements
Students must earn a minimum 2.00 GPA in the biology core and advanced biology areas of the major.

Biology Core

Course Number	Course Name	Credits
Biol 110 & 111*	Introduction to Biology & Opportunities in Biology	1.5
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

* Students transferring to ISU take Biol 112 (Transfer Student Orientation, 1 credit) instead of Biol 110 & 111.

Advanced Biology

Select **21 credits total** from the advanced biology course list. This must include:

- **2 advanced biology labs**, denoted by a **black dot** on the advanced course list.
- At least **9 credits from the Biol classes** listed below. The remaining advanced credits can be from Biol or other departments on the advanced list.

Advanced Biology Course List | Biol Courses

Course #	Course Title	Credits
Biol 319	Analysis of Environmental Systems	3
Biol 322	Intro to Bioinformatics	3
Biol 328	Molc. & Cell Bio of Human Disease	3
Biol 335	Human & Animal Physiology	3
Biol 335L •	Human & Animal Physiology Lab	1
Biol 336	Ecological & Evol. Animal Physiology	3
Biol 344	Human Reproduction	3
Biol 349 •	Genome Perspective in Biology	3
Biol 350 •	Comprehensive Human Anatomy	4
Biol 351 •	Comprehensive 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	3
Biol 357	Biology of Plants	3
Biol 358 •	Bee Biology, Mgmt., & Beekeeping	3
Biol 364	Invertebrate Biology	3-4
Biol 365 •	Vertebrate Biology	4
Biol 366 •	Plant Systematics	4
Biol 370 •	GIS for Ecology & Env. Science	1-6
Biol 371 •	Ecological Methods	3
Biol 375X	Marine Ecol. & Ecosystems Dynamics	3
Biol 393 •	North American Field Trips	1-4
Biol 394 •	International Field Trips	1-4
Biol 395X	Professional Development in Biol. Sci.	2
Biol 401	Fundamentals of Bioinformatics	4
Biol 402	Intro to Pathology	3
Biol 403X	Intro to Pathology II	3
Biol 414	Life History & Reproductive Strategy	3
Biol 421	Biological Principles of Aging	3
Biol 423	Developmental Biology	3
Biol 423L •	Developmental Biology Lab	1
Biol 428	Cell Biology	3
Biol 436	Neurobiology	3
Biol 451 •	Plant Evolution & Phylogeny	4
Biol 454 •	Plant Anatomy	4
Biol 455 •	Bryophyte & Lichen Diversity	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 465	Macroevolution	3
Biol 466X	Molecular & Genome Evolution	3
Biol 471	Intro Conservation Biology	3
Biol 472	Community Ecology	3
Biol 474	Plant Ecology	3
Biol 476	Functional Ecology	3
Biol 480[a] •	Studies in Marine Biology	1-8
Biol 481[a] •	Summer Field Studies	1-8
Biol 482 •	Tropical Biology	1-4
Biol 483	Environmental Biogeochemistry	3
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 490[a]	Independent Study	1
Biol 491[a] •	Undergraduate Teaching Experience	1-2
Biol 492	Preparing for Grad School in Biology	1
Biol 494[a] •	Biology Internship	1-3
Biol 495	Undergrad Seminar (various topics)	1-3
Biol 499[a] •	Undergraduate Research	1-3

[a] Students can apply a maximum of 7 credits of the following toward advanced biology requirements: Biol 480, 481, 490 (2 cr. max), 491 (2 cr. max), 494 (6 cr. max) and 499 (6 cr. max).

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B.S. 2022-2023

NOTE: Course offerings vary by semester. Check the University Catalog and Schedule of Classes to view availability.

Advanced Biology Course List | Other Departments

Agronomy Courses

Agron 316	Crop Structure-Func. Relationships	3
Agron 317	Principles of Weed Science	3
Agron 338 •	Seed Science & Technology	3
Agron 354	Soils & Plant Growth	3
Agron 421	Intro to Plant Breeding	3

Animal Science Courses

An S 313	Exercise Physiology of Animals	2
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 Technol.	3
An S 334 •	Embryo Transfer Lab	1
An S 337	Lactation	3
An S 345	Growth & Dev. of Domestic Animals	3
An S 352 •	Genetic Improv. of Domestic Animals	3
An S 419	Advanced Animal Nutrition	2

Anthropology Courses

Anthr 307 •	Biological Anthropology	3
Anthr 317	Primate Behavior, Ecology & Evolution	3
Anthr 319 •	Skeletal Biology	3
Anthr 424 •	Forensic Anthropology	3

Biochemistry Courses

BBMB 405	Biochemistry II	3
BBMB 411 •	Techniques in Biochem Research	4
BBMB 420	Mammalian Biochemistry	3
BBMB 430	Prokaryotic Diversity & Ecology	3

Bioinformatics & Computational Biology Courses

BCBio 406	Bioinformatics of OMICS	3

Biomedical Sciences Courses

B M S 329	Anat. & Phys. of Domestic Animals	3
B M S 401 •	Intro to Aquatic Animal Medicine	1
B M S 438	Principles of Physiology	4
B M S 448 •	Principles of Human Gross Anatomy	4

Entomology Courses

ENT 370 •	Insect Biology	3
ENT 374	Insects & Our Health	3
ENT 374L •	Insects & Our Health Lab	1
ENT 425 •	Aquatic Insects	3
ENT 471 •	Insect Ecology	3

Food Science & Human Nutrition Courses

FS HN 360	Adv. Human Nutrition & Metabolism	3
FS HN 362	Nutrition in Growth & Development	3
FS HN 364	Nutrition & Prev. of Chronic Disease	3
FS HN 367	Medical Terminology	1

Genetics Courses

Gen 340	Human Genetics	3
Gen 409	Molecular Genetics	3
Gen 410	Analytical Genetics	3

Geology Courses

Geol 406	Geology Field Course	1-2

Health Studies Courses

H S 350	Human Diseases	3

Horticulture Courses

Hort 321	Horticulture Physiology	3
Hort 322 •	Plant Propagation	3

Kinesiology Courses

Kin 355	Biomechanics	3
Kin 363	Basic Electrocardiography	2

Microbiology Courses

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 & Cellular Bacteriology	4
Micro 360	Global Health	3
Micro 402	Microbial Genetics & Genomics	3
Micro 408	Virology	3
Micro 420	Food Microbiology	3
Micro 475	Immunology	3
Micro 475L •	Immunology Lab	1

Natrual Resource Ecology & Management Courses

A Ecl 321 •	Fish Biology	3
A Ecl 366 •	Natural History of Iowa Vertebrates	3
A Ecl 415 •	Ecol. Freshwater Invert/Plant/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 •	Nat. Resource Photogammetry & GIS	3
NREM 358 •	Forest Herbaceous Layer	1
NREM 390	Fire Ecology & Management	3
NREM 407 •	Watershed Management	4
NREM 446 •	Integrating GPS & GIS for Nat. Res.	3
NREM 452 •	Ecosystem Management	3

Plant Pathology Courses

PL P 408	Principles of Plant Pathology	3
PL P 416	Forest Insects & Diseases	3
PL P 416L •	Forest Insects & Diseases Lab	1
PL P 477	Bacterial-Plant Interactions	3
PL P 494	Seed Pathology	2
PL P 494L •	Seed Pathology Lab	1

Psychology Courses

Psych 310	Brain & Behavior	3
Psych 315	Drugs & Behavior	3

Toxicology Courses

Tox 401	Principles of Toxicology	3
Tox 450	Pesticides in the Environment	3

NOTE: Courses on this list may have prerequisites not included in this list that do not count toward the advanced biology requirement.