

Detailed Undergraduate Genetics Major Degree Requirements 2016-2017 University Catalog

The B.S. degree in Genetics is offered in both the College of Agriculture and Life Sciences (AGLS) and the College of Liberal Art and Sciences (LAS). The AGLS and LAS majors are nearly identical in their scientific components, whereas the general education courses vary to suit the interests and career objectives of individual students. The degree requires a minimum of 120 credits.

Many of the requirements are electives that can be chosen from approved lists. These lists or links to them appear on pages 3-5 of this document.

I. UNIVERSITY REQUIREMENTS (13 credits)

- 1) ENGL 150, Critical Thinking and Communication (3 cr) Minimum C
- 2) ENGL 250, Written, Oral, Visual, and Electronic Composition (3 cr) Minimum C. *Students with an ACT E of 24 or higher can start with ENGL 250 and receive credit for ENGL 150 upon successful completion of ENGL 250 taken at Iowa State University.*
- 3) LIB 160, Library Instruction (1 cr)
- 4) International Perspectives course from university-approved list (3 cr) (may dual count for a College requirement if on both lists)
- 5) U.S. Diversity course from university-approved list (3 cr) (may dual count for a College requirement if on both lists)

II. COLLEGE REQUIREMENTS

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

- 1) SPCM 212, Fundamentals of Public Speaking (3 cr)
or
AGEDS 311, Presentation Strategies (3 cr)
- 2) Humanities course from college-approved list (3 cr)
- 3) Social Sciences course from college-approved list (3 cr)
- 4) Ethics course from college-approved list (3 cr)

COLLEGE OF LIBERAL ARTS AND SCIENCES

- 1) World Language Requirement (0-8 cr) Is met by three or more years of high school foreign language. For students with one or two years of high school language study the requirement can be met by taking one course (4 cr) or passing an examination for course credit. Students with no language study in high school are required to take 8 cr of college-level World Language courses.
- 2) Humanities courses from college-approved list (12 cr, including 3 cr of Science/Humanities Bridge, see list)
- 3) Social Sciences courses from college-approved list (9 cr)

SUMMARY OF DIFFERENCES BETWEEN THE AGLS AND LAS MAJORS

Course	Credits Required	
	AGLS	LAS
World Languages	None	0-8
Environmental Awareness	3-4	None
General Education Requirements	9	21
Speech	3	None

III. GENETICS MAJOR REQUIREMENTS

Genetics and Life Sciences (35 - 39 cr)

- 1) GEN 110, Genetics Orientation (1 cr) *fall only*
- 2) BIOL 211 and 211L, Principles of Biology I (4 cr) *fall, spring, summer (no labs offered)*
- 3) BIOL 212 and 212L, Principles of Biology II (4 cr) *fall, spring*
- 4) GEN 313 and 313L, Principles of Genetics (4 cr) *fall, spring, summer (no labs offered)*
- 5) BIOL 314, Principles of Molecular Cell Biology (3 cr) *fall, spring*
- 6) BIOL 315, Biological Evolution (3 cr) *fall, spring, summer*
- 7) GEN 409 **or** GDCB 511, Molecular Genetics (3 cr), *fall, spring*
- 8) GEN 410, Analytical Genetics (3 cr) *fall, spring*
- 9) GEN 462, Evolutionary Genetics (3 cr) *fall only*, or EEOB 561, Evolutionary and Ecological Genomics (3 cr), *spring only*, or EEOB 563, Molecular Phylogenetics (3 cr) *spring only*
- 10) GEN 322, Introduction to Bioinformatics and Computational Biology (3 cr) *fall only*, or GEN 349, The Genome Perspective in Biology (3 cr) *spring only*, or GEN 444, Bioinformatic Analysis (3 cr) *spring only*
- 11) GEN 491, Undergraduate Seminar (1 cr) *fall, spring*
- 12) MICRO 302, Biology of Microorganisms (3 cr) *fall, spring, summer*
- 13) Course to meet Environmental Awareness (3-4 cr), **College of AGLS only**

Note: A grade of C- or better is required in each of the courses in this group.

Supporting Sciences (34 - 36 cr)

- 1) CHEM 177 and 177L, General Chemistry I (5 cr)
- 2) CHEM 178 and 178L, General Chemistry II (4 cr)
- 3) CHEM 331/L, Organic Chemistry I (4 cr)
- 4) CHEM 332/L, Organic Chemistry II (4 cr)
- 5) PHYS 111/112, General Physics I and II (10 cr)
or
PHYS 221/222, Classical Physics I and II (10 cr)
- 6) BIOCHEMISTRY (6 - 7 cr)
Option 1
 - a) BBMB 404, Biochemistry I (3 cr) **and**
 - b) BBMB 405, Biochemistry II (3 cr)**or**
BBMB 411, Techniques in Biochemical Research (3 cr)
or
CHEM 211 and 211L, Quantitative and Environmental Analysis (4 cr)
or
CHEM 325, Chemical Thermodynamics (3 cr)
Option 2
 - a) BBMB 420, Physiological Biochemistry (3 cr) **and**
 - b) BBMB 411, Techniques in Biochemical Research (3 cr)**or**
CHEM 211 and 211L, Quantitative and Environmental Analysis (4 cr)
or
CHEM 325, Chemical Thermodynamics (3 cr)

Advanced Science Elective courses from among the following choices (6 cr)

One of: AGRON/HORT 421 or ANS 352
AN S 331, 332, 333, 345
ANTHR 307, 319, 424
BBMB courses numbered 400 or above
BCBIO 322, 401, 402 (2016-17 additions)
BIOL courses numbered 300 or above except: 307, 355, 356, 366, 393A, 393B,
491, 495, 498
CHEM 211/211L and CHEM courses numbered 300 or above
EEOB 561, 562, 563, 566, 567
GEN 322, 340, 349, 444, 490, 492 (formerly 490U), 495, 496 (formerly 490S), 499 (formerly 490R),
499H (formerly 490H)
GDCB courses, except 508, 511
MICRO courses numbered 300 or above, except 302
PHYS 461
PSYCH 310
STAT 301, 401, 402, 403

Notes:

- A grade of C⁻ or better is required in each course. Satisfactory grades in S/F courses GEN 492 or 496 are also acceptable.
- Courses selected for this area cannot be used to meet any other requirement of the Genetics major.
- No more than 2 credits of GEN 490U or GEN 492 may be applied toward the Genetics advanced course requirement.
- 2016-17 No more than 3 cr. of GEN 490, 490R, 490H, 492, 496, 499, or 499H may be used to meet this requirement.
- Students may use no more than 9 credits of university-wide 490-499 credits toward the total of 120 credits required for graduation.

Advanced English Writing from Program-Approved List (3 cr) Minimum C.

Choose from:

ENGL 302: Business Communication
ENGL 303: Free-Lance Writing for Popular Magazines
ENGL 304: Creative Writing - Fiction
ENGL 305: Creative Writing - Nonfiction
ENGL 306: Creative Writing - Poetry
ENGL 309: Report and Proposal Writing
ENGL 310: Rhetorical Analysis
ENGL 312: Biological Communication
ENGL 313: Writing for the World Wide Web
ENGL 314: Technical Communication
ENGL 315: Creative Writing - Screenplays
ENGL 316: Creative Writing - Playwriting
JLMC 347: Science Communication

Mathematics (11 - 12 cr)

Option 1

- 1) MATH 165/166, Calculus I and II (8 cr)
 - 2) STAT 101, Principles of Statistics (4 cr)
- or
- STAT 104, Introduction to Statistics (3 cr)

Option 2

- 1) MATH 181/182, Calculus and Mathematical Modeling for the Life Sciences (8 cr)
 - 2) STAT 101, Principles of Statistics (4 cr)
- or
- STAT 104, Introduction to Statistics (3 cr)

Option 3

- 1) STAT 101, Principles of Statistics (4 cr)
- or
- STAT 104, Introduction to Statistics (3 cr)
- 2) STAT 301, Intermediate Statistical Concepts and Methods (4 cr)
- or
- STAT 401, Statistical Methods for Research Workers (4 cr) (being phased out for undergraduates)
- 4) MATH 160, Survey of Calculus (4 cr), MATH 165, Calculus I (4 cr), or MATH 181, Calculus and Mathematical Modeling for the Life Sciences I (4 cr)

Program-Approved Science/Humanities Bridge Courses (LAS ONLY)

- BIOL 307^{USD}: Women in Science and Engineering (cross-listed with W S 307), offered F
- ENV S 334: Environmental Ethics (cross-listed with PHIL 334), offered F
- ENV S 384^{IP}: Religion and Ecology (cross-listed with PHIL 384), offered F, S
- ENV S 472: U.S. Environmental History (cross-listed with HIST 472), offered F, S
- HIST 280^{IP}: Introduction to History of Science I, offered F, S
- HIST 281^{IP}: Introduction to History of Science II, offered F, S
- HIST 284^{IP}: Wonders of the World, Ancient to Early Modern, offered F
- HIST 285: Modern Wonders of the World, offered S
- HIST 323^{IP}: Science and Religion (cross-listed with RELIG 323), offered F, S
- HIST 380^{USD}: History of Women in Science, Technology, and Medicine (cross-listed with W S 380), offered F, S
- HIST 382X: History and Philosophy of the Scientific Revolution (cross-listed with PHIL 382X), offered F, S
- HIST 383^{IP}: Technology, Public Science, and European Culture, 1715-Present, offered F, S
- HIST 388: History of Modern Astronomy, offered F, S
- HIST 472: U.S. Environmental History (cross-listed with ENV S 472), offered F, S
- HIST 482: Birth, Death, Medicine, and Disease, offered F, S
- HIST 483: Modern Science and Human Nature (no longer offered)
- HIST 486: History of Medicine, Gender, and the Body (no longer offered)
- HIST 488: American Stuff, Colonial Times to the Present, offered F, S
- HIST 489: History of American Science (no longer offered)
- PHIL 206: Introduction to Logic and Scientific Reasoning, offered F, S, SS

PHIL 230: Moral Theory and Practice, offered F, S, SS
PHIL 235^{USD}: Ethical Issues in a Diverse Society, offered S
PHIL 330: Ethical Theory, offered F
PHIL 331: Moral Problems in Medicine, offered Alt S, odd-numbered years
PHIL 334: Environmental Ethics (cross-listed with ENV S 334), offered F
PHIL 336: Bioethics and Biotechnology, offered F, S
PHIL 343: Philosophy of Technology (cross-listed with T SC), offered F, S
PHIL 380: Philosophy of Science, offered F
PHIL 382X, History and Philosophy of the Scientific Revolution (cross-listed with HIST 382X), offered F, S
PHIL 465: Brains, Minds, and Computers, offered F
PHIL 480: Controversies in Science, offered S
PHIL 483: Philosophy of Biology, offered S
RELIG 323^{IP}: Science and Religion (cross-listed with HIST 323), offered F, S
RELIG 324: Christianity and Science, offered S
RELIG 360: Religious Ethics, offered F, S
RELIG 384^{IP}: Religion and Ecology (cross-listed with ENV S 384), offered F, S
T SC 343: Philosophy of Technology (cross-listed with PHIL 343), offered F, S
W S 307^{USD}: Women in Science and Engineering (cross-listed with BIOL 307), offered F

Program-Approved Environmental Awareness Courses (AGLS ONLY)

AGRON 120. Introduction to Renewable Resources. (Cross-listed with ENV S, NREM). (3-0) Cr. 3. F.S.
AGRON 260. Soils and Environmental Quality. (Cross-listed with ENV S). (3-0) Cr. 3. F.S.
BIOL 173. Environmental Biology. (Cross-listed with ENV S). (3-0) Cr. 3. F.S.
BIOL 312. Ecology. (Cross-listed with A ECL, ENSCI). (3-3) Cr. 4. F.SS.
ENSCI 301. Natural Resource Ecology and Soils. (Cross-listed with NREM). (3-3) Cr. 4. F.
ENSCI 384. Introduction to Ecosystems. (3-0) Cr. 3. S.
ENSCI 484. Ecosystem Ecology. (Cross-listed with BIOL). (3-0) Cr. 3. Alt. S., offered odd-numbered years.
MICRO 485. Soil and Environmental Microbiology. (Dual-listed with MICRO 585). (Cross-listed with AGRON, ENSCI). (2-3) Cr. 3. F.

University Approved Lists

<http://www.registrar.iastate.edu/students/div-ip-guide/IntlPerspectives-current>

<http://www.registrar.iastate.edu/students/div-ip-guide/usdiversity-courses>

College Approved Lists

AGLS

<http://www.cals.iastate.edu/student-services/humanities>

<http://www.cals.iastate.edu/student-services/social-sciences>

<http://www.cals.iastate.edu/student-services/ethics>

LAS

<http://www.las.iastate.edu/students/academics/general-education/general-education-approved-course-list-2016-17/>