Biology, B.S.

All biology majors complete the chemistry/physics/mathematics foundation and the biology core. In addition, B.S. students choose one of six tracks, while B.A. students choose courses from several breadth menus and have a wider selection of elective courses.

The department acquaints undergraduate students with the nature of practicing scientists' work by offering BIOL:3994 Introduction to Research (requires a Department of Biology faculty sponsor), BIOL:4898 Communicating Research (a course supporting students involved in research), and BIOL:4999 Honors Research in Biology (requires membership in the Biology Honors Program). Students associate with one of the department's research groups in experiments, discussion of current research, study of specialized topics, and attendance at research seminars.

Students interested in field biology, zoology, or botany may take varied courses in those subjects offered during the summer at Iowa Lakeside Laboratory.

### Requirements

The Bachelor of Science with a major in biology requires a minimum of 120 s.h., including at least 65-76 s.h. of work for the major. Students must maintain a g.p.a. of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences General Education Program.

The major is divided into six tracks that emphasize the most dynamic and active areas in the biological sciences. Five of the tracks—cell and developmental biology, genetics and biotechnology, evolutionary biology, neurobiology, and plant biology—emphasize distinct areas. The sixth track—comprehensive biology—provides highly diverse content. Students working toward a Bachelor of Science degree must complete the chemistry/physics/mathematics foundation, the biology core, and one of the six tracks.

Students who wish to apply transfer credit toward graduation with a major in biology should consult their biology advisor.

The B.S. with a major in biology requires the following course work.

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry/Physics/Mathematics Foundation</td>
<td>26 Courses</td>
</tr>
<tr>
<td>Biology Core Courses</td>
<td>16</td>
</tr>
<tr>
<td>Track Courses</td>
<td>23-34</td>
</tr>
<tr>
<td>Total Hours</td>
<td>65-76</td>
</tr>
</tbody>
</table>

### Chemistry/Mathematics/Physics Foundation

All of these:  
CHEM:1110 &  
CHEM:1120  
CHEM:2210  
One of these sequences:  
PHYS:1511-  
PHYS:1512  
PHYS:1611-  
PHYS:1612

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH:1460 Calculus for the Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1550 Engineering Mathematics I: Single Variable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1850 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>One of these:</td>
<td></td>
</tr>
<tr>
<td>STAT:2010 Statistical Methods and Computing (preferred for evolution track)</td>
<td>3</td>
</tr>
<tr>
<td>STAT:3510 Biostatistics</td>
<td>3</td>
</tr>
</tbody>
</table>

### Biology Core

All of these:  
BIOL:1411-Foundations of Biology | 8 |
BIOL:1412-Diversity of Form and Function | 4 |
BIOL:2512 Fundamental Genetics | 4 |
BIOL:3172 Evolution | 4 |

### Tracks for the Bachelor of Science

Bachelor of Science students majoring in biology must select a single track. Each track includes seven or eight courses. The experiential elective requirement may be satisfied by taking an appropriate investigative lab for the track, or through several other options: students who use BIOL:4999 Honors Research in Biology to fulfill the experiential elective requirement must complete a minimum of 6 s.h. in that course; students who use BIOL:3994 Introduction to Research must complete a minimum of 5 s.h. in that course in combination with 1 s.h. in BIOL:4898 Communicating Research; and students who use BIOL:4897 Teaching Internship in Biology must complete a minimum of 4 s.h. in that course.

### Cell and Developmental Biology Track

The cell and developmental biology track provides education in the structure and function of cells and in the principles of development as they apply to animals and plants. This track is appropriate for students who wish to pursue graduate study in cellular and developmental biology, to prepare for professional study in medicine and other health-related fields, or to take positions in laboratories and companies engaged in cancer research and related fields.

<table>
<thead>
<tr>
<th>Group 1 (Biochemistry)</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of these:</td>
<td>BIOC:3110 Biochemistry</td>
</tr>
<tr>
<td>One of these:</td>
<td>BIOC:3120 &amp; Biochemistry and Molecular Biology</td>
</tr>
<tr>
<td>One of these:</td>
<td>BIOC:3130 Biology I-II</td>
</tr>
</tbody>
</table>

### Group 2 (Cell/Developmental Biology Core)

This course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:2723 Cell Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

### Group 3 (Experiential Elective)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:3233 Introduction to Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL:3363 Plant Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL:3626 Cell Biology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL:3736 Developmental Biology Lab</td>
<td>4</td>
</tr>
</tbody>
</table>
One of these:
- BIOL:3626  Cell Biology Laboratory (if not used for group 2 above)  4
- BIOL:3656  Neurobiology Laboratory  4
- BIOL:3676  Evolution Lab  4
- BIOL:3716  Genetics and Biotechnology Lab  4
- BIOL:3799 & BIOL:4898  Introduction to Research - Communicating Research (BIOL:3994 must be taken for a total of 5 s.h.)  6
- BIOL:4897  Teaching Internship in Biology (must be taken two different semesters for a total of 4 s.h.)  4
- BIOL:4999  Honors Research in Biology (in cell/developmental biology)  6

**Group 4 (Electives)**
At least two of these, with a minimum of one course numbered 3000 or above:
- BIOL:2254  Endocrinology  3
- BIOL:2603  Mechanisms of Aging  3
- BIOL:2753  Introduction to Neurobiology  3
- BIOL:3233  Introduction to Developmental Biology (if not used for group 2 above)  3
- BIOL:3253  Neurobiology  4
- BIOL:3314  Genomics  3
- BIOL:3343  Animal Physiology  3
- BIOL:3363  Plant Developmental Biology (if not used for group 2 above)  3
- BIOL:3663  Plant Response to the Environment  3
- BIOL:3713  Molecular Genetics  4
- BIOL:4213  Bioinformatics  4
- BIOL:4333  Genes and Development  3
- BIOL:4753  Developmental Neurobiology  3
- MICR:2157  General Microbiology  3
- MICR:3147  Immunology and Human Disease  3

**Evolutionary Biology Track**
The evolutionary biology track provides education in the principles of evolution as they apply to understanding diversity within and among species, from genomic, ecological, and historical perspectives. This track is appropriate for students who wish to pursue graduate study in evolutionary biology and related fields or to take positions in laboratories using population genetics or phylogenetic approaches such as forensics, fisheries, and human disease mapping.

**Group 1 (Biochemistry)**
One of these:
- BIOL:3110  Biochemistry  3
- BIOL:3120 & BIOL:3130  Biochemistry and Molecular Biology I-II  6

**Group 2 (Evolution Core)**
Both of these:
- BIOL:2673  Ecology  3
- BIOL:3676  Evolution Lab  4
One of these:
- BIOL:3314  Genomics  3
- BIOL:3373  Human Population Genetics and Variation  3
- BIOL:4273  Population Genetics and Molecular Evolution  3
- BIOL:4373  Molecular Evolution: Genes, Genomes, and Organisms  3

**Group 3 (Experiential Elective)**
One of these:
- BIOL:3716  Genetics and Biotechnology Lab  4
- BIOL:3999 & BIOL:4898  Introduction to Research - Communicating Research (BIOL:3994 must be taken for a total of 5 s.h.)  6
- BIOL:4897  Teaching Internship in Biology (must be taken two different semesters for a total of 4 s.h.)  4
- BIOL:4999  Honors Research in Biology (in evolution)  6
An approved Iowa Lakeside Laboratory course  4

**Group 4 (Electives)**
At least two of these, with a minimum of one course numbered 3000 or above:
- BIOL:2346  Vertebrate Zoology  4
- BIOL:2374  Biogeography  3
- BIOL:3244  Animal Behavior  3,5
- BIOL:3314  Genomics (if not used for group 2 above)  3
- BIOL:3373  Human Population Genetics and Variation (if not used for group 2 above)  3
- BIOL:3483  Plant Response to the Environment (if not used for group 2 above)  3
- BIOL:4213  Bioinformatics  4
- BIOL:4273  Population Genetics and Molecular Evolution (if not used for group 2 above)  3
- BIOL:4373  Molecular Evolution: Genes, Genomes, and Organisms (if not used for group 2 above)  3
- ANTH:2320  Anthropological Perspectives on Human Infectious Disease: Origins and Evolution  3
- ANTH:3307  Modern Human Origins  3
- ANTH:3325  Human Evolutionary Genetics  3
- EES:3220  Evolution of the Vertebrates  3
- EES:4440  Phylogenetics and Biodiversity  3
- EES:4700  Evolution of Ecosystems  3
Genetics and Biotechnology Track
The genetics and biotechnology track provides education in the key principles of transmission, maintenance, regulation, and manipulation of genes. This track is appropriate for students who wish to pursue graduate study in fields related to genetics or to enter the modern biotechnology industry. It also provides excellent preparation for professional study in medicine and other health-related fields.

Group 1 (Biochemistry)
One of these:
- BIOC:3110 Biochemistry 3
- BIOC:3120 & BIOC:3130 Biochemistry and Molecular Biology I-II 6

Group 2 (Genetics Core)
All of these:
- BIOL:3314 Genomics 3
- BIOL:3713 Molecular Genetics 4
- BIOL:3716 Genetics and Biotechnology Lab 4

Group 3 (Experiential Elective)
One of these:
- BIOL:3626 Cell Biology Laboratory 4
- BIOL:3676 Evolution Lab 4
- BIOL:3716 Genetics and Biotechnology Lab 4
- BIOL:3994 & BIOL:4898 Introduction to Research - Communicating Research (BIOL:3994 must be taken for a total of 5 s.h.) 6
- BIOL:4897 Teaching Internship in Biology (must be taken two different semesters for a total of 4 s.h.) 4
- BIOL:4999 Honors Research in Biology (in neurobiology) 6

Group 4 (Electives)
At least two of these, with a minimum of one course numbered 3000 or above:
- BIOL:2254 Endocrinology 3
- BIOL:2603 Mechanisms of Aging 3
- BIOL:2723 Cell Biology 3
- BIOL:3233 Introduction to Developmental Biology 3
- BIOL:3363 Plant Developmental Biology 3
- BIOL:3663 Plant Response to the Environment 3
- BIOL:4213 Bioinformatics 4
- BIOL:4273 Population Genetics and Molecular Evolution 3
- BIOL:4333 Genes and Development 3
- BIOL:4373 Molecular Evolution: Genes, Genomes, and Organisms 3
- ANTH:2320 Anthropological Perspectives on Human Infectious Disease: Origins and Evolution 3
- MICR:3170 Microbial Genetics 3

Neurobiology Track
The neurobiology track provides education in nervous system function at all levels, from molecular to systems biology. This track is appropriate for students who wish to pursue graduate study in neurobiology and related areas, including psychology and the social sciences; to enter laboratories that study the therapeutic basis of neurological disorders; or to work in pharmaceutical companies. It also provides good preparation for professional study in medicine and other health-related fields.

Group 1 (Biochemistry)
One of these:
- BIOC:3110 Biochemistry 3
- BIOC:3120 & BIOC:3130 Biochemistry and Molecular Biology I-II 6

Group 2 (Neurobiology Core)
All of these:
- BIOL:2753 Introduction to Neurobiology 3
- BIOL:3244 Animal Behavior 5
- BIOL:3253 Neurobiology 4
- BIOL:3656 Neurobiology Laboratory 4

Group 3 (Experiential Elective)
One of these:
- BIOL:3626 Cell Biology Laboratory 4
- BIOL:3676 Evolution Lab 4
- BIOL:3716 Genetics and Biotechnology Lab 4
- BIOL:3994 & BIOL:4898 Introduction to Research - Communicating Research (BIOL:3994 must be taken for a total of 5 s.h.) 6
- BIOL:4897 Teaching Internship in Biology (must be taken two different semesters for a total of 4 s.h.) 4
- BIOL:4999 Honors Research in Biology (in neurobiology) 6

Group 4 (Electives)
At least two of these, with a minimum of one course numbered 3000 or above:
- BIOL:2254 Endocrinology 3
- BIOL:2603 Mechanisms of Aging 3
- BIOL:2723 Cell Biology 3
- BIOL:3233 Introduction to Developmental Biology 3
- BIOL:3343 Animal Physiology 3
- BIOL:4333 Genes and Development 3
- BIOL:4353 Neurophysiology: Cells and Systems 3
- BIOL:4753 Developmental Neurobiology 3

Plant Biology Track
The plant biology track provides education in how plants grow, how they have evolved, and how they interact with other organisms. This track is appropriate for students who wish to pursue graduate study in biology specializing in plants. It also is good preparation for positions in plant biotechnology companies that work in biofuels development, crop improvement, or carbon dioxide sequestration, or in agencies dedicated to the conservation of natural lands.

Group 1 (Biochemistry)
One of these:
- BIOC:3110 Biochemistry 3
BIOC:3120 & BIOC:3130 Biochemistry and Molecular Biology I-II 6

**Group 2 (Plant Biology Core)**
Both of these:
BIOC:3363 Plant Developmental Biology 3
BIOC:3663 Plant Response to the Environment 3

One of these:
BIOC:3676 Evolution Lab 4
BIOC:3716 Genetics and Biotechnology Lab (if not used for group 2 above) 4

**Group 3 (Experiential Elective)**
One of these:
BIOC:3120 & BIOC:3130 Biochemistry and Molecular Biology I-II 6
BIOC:3110 Genomics - Biochemistry 6

**Group 4 (Electives)**
At least two of these, with a minimum of one course numbered 3000 or above:
BIOC:3314 & BIOC:3110 Genomics - Biochemistry 6

**Group 5 (Investigative Lab)**
One of these:
BIOC:3663 Plant Response to the Environment 3

**Group 6 (Experiential Elective)**
At least one of these:
BIOC:3994 & BIOC:4898 Introduction to Research - Communicating Research (BIOC:3994 must be taken for a total of 5 s.h.) 6

**Comprehensive Biology Track**
The comprehensive biology track offers a diverse, well-balanced introduction to the major fields of biology. This track prepares students for graduate study in the biological sciences and in science education and for work in laboratories that engage in research and applications in many fields of biology. It also provides broadly based preparation for professional study in medicine and other health-related fields.

**Group 1 (Biochemistry and Molecular Biology)**
One of these sequences:
BIOC:3120 & BIOC:3130 Biochemistry and Molecular Biology I-II 6
BIOC:3110 Genomics - Biochemistry 6

**Group 2 (Cellular Biology)**
One of these:
BIOC:3110 Genomics - Biochemistry 6

**Group 3 (Biological Systems)**
One of these:
BIOC:3110 Genomics - Biochemistry 6

**Group 4 (Population Biology)**
One of these:
BIOC:3110 Genomics - Biochemistry 6

**Group 5 (Investigative Lab)**
One of these:
BIOC:3110 Genomics - Biochemistry 6

**Group 6 (Experiential Elective)**
At least one of these:
BIOC:3110 Genomics - Biochemistry 6

An approved Iowa Lakeside Laboratory course on plant diversity or plant ecology 4
Fulfill the following requirements:

To graduate with honors in the biology major, students must

- Programs.
- Department of Biology and by other departments and
- Enroll in honors sections of courses offered by
- Undergraduate residence, departmental honors students
- Presentation and in writing scientific English. Throughout
- Seminar (BIOL:4998), or an equivalent seminar, provides students
- Address specific questions and test specific hypotheses
- Student has acquired the necessary experimental skills to
- Supervisor. The thesis should clearly document that the
- Biological problem, which is usually identified by the research
- Students majoring in biology have the opportunity to graduate
- The Biology Honors Program
- Students majoring in biology have the opportunity to graduate
- The Biology Honors Program introduces students to the pursuits of practicing scientists.
- Students associate with one of the department’s
- Research groups and participate in an independent research
- Students with a strong interest in science teaching may
- Complete a science education major. Students choose one of
- Earn a Bachelor of Science degree. They
- May apply for admission to the Teacher Education Program.
- See B.S. in Science Education in the Teaching and Learning
- Honors
- Honors in the Major
- Students majoring in biology have the opportunity to graduate
- The Biology Honors Program introduces students to the pursuits of practicing scientists.
- Honors students associate with one of the department’s
- Research groups and participate in an independent research
- Project guided by a faculty member (the research supervisor).
- Biology honors students write a thesis based on an interesting
- Biological problem, which is usually identified by the research
- Supervisor. The thesis should clearly document that the
- Student has acquired the necessary experimental skills to
- Address specific questions and test specific hypotheses
- Related to the research problem. Honors Seminar in Biology
- (BIOL:4998), or an equivalent seminar, provides students
- With an ideal opportunity to improve their skills in seminar
- Presentation and in writing scientific English. Throughout
- Undergraduate residence, departmental honors students
- Also may enroll in honors sections of courses offered by
- The Department of Biology and by other departments and
- Programs.
- To graduate with honors in the biology major, students must
- Fulfill the following requirements:
- Complete the requirements for a major in biology
- With a g.p.a. of at least 3.33 in all course work in the
- Major taken at the University of Iowa (including all
- Biology courses and cognates in chemistry, physics,
- Biochemistry, mathematics, and statistics);
- Complete 1 s.h. in BIOL:4899 Communicating Research;
- Complete 2 s.h. in either BIOL:4998 Honors Seminar in
- Biology or an advanced biology seminar course;
- Complete a minimum of 6 s.h. (taken over two or more
- Semesters) of BIOL:4999 Honors Research in Biology;
- Write a brief research proposal summarizing the
- Background and goals of their proposed honors research;
- Upon completion of their research, submit an acceptable
- Honors thesis; and
- Give a brief oral presentation of their research findings to
- Other biology honors students.

Students may apply 6 s.h. of BIOL:4999 Honors Research in
- Biology toward the experiential elective requirement in an
- Appropriate track.
- Biology majors interested in graduating with honors in the
- Major should contact the biology honors advisor as early as
- Possible, preferably during their sophomore or junior year,
- So that they may be matched with an appropriate lab. Visit
- Biology Honors Program to learn more about honors study in
- The department.

University of Iowa Honors Program

In addition to honors in the major, students have opportunities
- For honors study and activities through membership in the
- University of Iowa Honors Program. Visit Honors at Iowa to
- Learn about the University’s honors program.
- Students who satisfy the requirements for honors in the
- Biology major also satisfy Level Two: Learning by Doing of
- The University Honors Requirements.
- Membership in the UI Honors Program is not required to earn
- Honors in the biology major.

Academic Plans

Four-Year Graduation Plan

The following checkpoints list the minimum requirements
- Students must complete by certain semesters in order to stay
- On the University’s Four-Year Graduation Plan. Courses in the
- Major are those required to complete the major; they may be
- Offered by departments other than the major department.
- Before the third semester begins: MATH:1460 Calculus
- For the Biological Sciences or MATH:1850 Calculus I or
- MATH:1550 Engineering Mathematics I; Single Variable
- Calculus, CHEM:1110 Principles of Chemistry I, CHEM:1120
- Principles of Chemistry II, and BIOL:1411 Foundations of
- Biology
- Before the fifth semester begins: BIOL:1412 Diversity
- Of Form and Function, CHEM:2210 Organic Chemistry I,
- STAT:2010 Statistical Methods and Computing or STAT:3510
- Biostatistics, and two other courses in the major
- Before the seventh semester begins: BIOL:2512
- Fundamental Genetics; BIOL:3172 Evolution; PHYS:1511
- College Physics I and PHYS:1512 College Physics II or
- Equivalents; five or six more courses in the major, including
- An investigative lab; and at least 90 s.h. earned toward the
- Degree
- Before the eighth semester begins: two or three more
- Courses in the major
During the eighth semester: enrollment in all remaining course work in the major, all remaining General Education courses, and a sufficient number of semester hours to graduate

**Sample Plans of Study**

**Biology (B.S.)**

### Cell and Developmental Biology Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong> Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric)</td>
<td>4</td>
</tr>
<tr>
<td>GE: Diversity and Inclusion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa (required)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td></td>
<td>16-18</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL:1411</td>
<td>Foundations of Biology (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1460</td>
<td>Calculus for the Biological Sciences (GE: Quantitative or Formal Reasoning)</td>
<td>4</td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td></td>
<td>15-17</td>
</tr>
</tbody>
</table>

### Second Year Fall

| BIOL:1412 | Diversity of Form and Function | 4 |
| CHEM:2210 | Organic Chemistry I | 3 |
| Major: statistics course | 3 |
| GE: World Languages or elective course | 3-5 |
| Elective course | 2-3 |
| **Hours** | | 15-18 |

### Spring

| BIOL:2512 | Fundamental Genetics | 4 |
| BIOL:2723 | Cell Biology | 3 |
| PHYS:1511 | College Physics I | 4 |
| GE: World Languages or elective course | 3-5 |
| Elective course | 1 |
| **Hours** | | 15-17 |

### Third Year Fall

| ENGL:1200 | The Interpretation of Literature (GE: Interpretation of Literature) | 3 |
| PHYS:1512 | College Physics II | 4 |
| Major: biochemistry course | 3 |
| Major: developmental biology course | 3 |
| GE: Social Sciences | 3 |
| **Hours** | | 16 |

### Spring

| BIOL:3172 | Evolution | 4 |
| Major: biochemistry or elective course | 3 |
| Major: investigative laboratory course | 4 |

### Comprehensive Biology Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong> Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric)</td>
<td>4</td>
</tr>
<tr>
<td>GE: Diversity and Inclusion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa (required)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td></td>
<td>16-18</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL:1411</td>
<td>Foundations of Biology (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1460</td>
<td>Calculus for the Biological Sciences (GE: Quantitative or Formal Reasoning)</td>
<td>4</td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td></td>
<td>15-17</td>
</tr>
</tbody>
</table>

1. General Education (GE) courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses. For more information, view the General Education Program.

2. Students may use their elective courses to complete a double major, minors, or certificates.

3. Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

4. Enrollment in chemistry and math courses require completion of placement exams.

5. Biochemistry option can be one semester of BIOC:3110 Biochemistry or two semesters of BIOC:3120 Biochemistry and Molecular Biology I and BIOC:3130 Biochemistry and Molecular Biology II.
**Second Year**

**Fall**
- BIOL:1412 Diversity of Form and Function 4
- CHEM:2210 Organic Chemistry I 3
- Major: statistics course 3
- GE: World Languages or elective course 3-5
- Elective course 2 2-3

**Spring**
- BIOL:2512 Fundamental Genetics 4
- PHYS:1511 College Physics I 4
- GE: Social Sciences 3
- GE: World Languages or elective course 3-5
- Elective course 1

**Hours** 15-18

**Third Year**

**Fall**
- ENGL:1200 The Interpretation of Literature (GE: Interpretation of Literature) 3
- PHYS:1512 College Physics II 4
- Major: biochemistry requirement I 3-4
- Major: comprehensive requirement (cellular biology) 3
- Elective course 2-3

**Hours** 15-17

**Spring**
- BIOL:3172 Evolution 4
- Major: biochemistry requirement II 3
- Major: comprehensive requirement II (biology systems) 3
- GE: Historical Perspectives 3
- GE: International and Global Issues 3

**Hours** 16

**Fourth Year**

**Fall**
- Major: comprehensive requirement III (population biology) 3
- Major: experiential elective or elective course 3-4
- GE: Literary, Visual, and Performing Arts 3
- Elective course 3
- Elective course 3

**Hours** 15-16

**Spring**
- Major: comprehensive requirement IV (investigative laboratory) 4
- Major: experiential elective or elective course 3-4
- GE: Values and Culture 3
- Elective course 3

**Hours** 13-14

**Total Hours** 120-133

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3 Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

4 Enrollment in chemistry and math courses require completion of placement exams.

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**Evolutionary Biology Track**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric)</td>
<td>4</td>
</tr>
<tr>
<td>GE: Diversity and Inclusion</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td></td>
<td>3-5</td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa (required)</td>
<td>2</td>
</tr>
</tbody>
</table>

**Hours** 16-18

**Spring**
- BIOL:1411 Foundations of Biology (GE: Natural Sciences with a lab) 4
- CHEM:1120 Principles of Chemistry II (GE: Natural Sciences with a lab) 4
- MATH:1460 Calculus for the Biological Sciences (GE: Quantitative or Formal Reasoning) 4
- GE: World Languages or elective course 3-5

**Hours** 15-17

**Second Year**

**Fall**
- BIOL:1412 Diversity of Form and Function 4
- CHEM:2210 Organic Chemistry I 3
- Major: statistics course 3
- GE: World Languages or elective course 3-5
- Elective course 2 2-3

**Hours** 15-18

**Spring**
- BIOL:2512 Fundamental Genetics 4
- PHYS:1511 College Physics I 4
- GE: Social Sciences 3
- GE: World Languages or elective course 3-5
- Elective course 1

**Hours** 15-17

**Third Year**

**Fall**
- BIOL:3172 Evolution 4
- BIOL:2673 Ecology 3
- ENGL:1200 The Interpretation of Literature (GE: Interpretation of Literature) 3
- PHYS:1512 College Physics II 4
- Major: biochemistry course option 3

**Hours** 17

**Spring**
- Major: biochemistry course option 3
- Major: evolution requirement 3
- GE: Historical Perspectives 3
- GE: International and Global Issues 3
Elective course

Hours 15

Fourth Year
Fall
Major: evolution elective I 3
Major: evolution laboratory 4
Major: experiential elective or elective course 3-4
GE: Literary, Visual, and Performing Arts 3
Elective course 2-3

Hours 15-17

Spring
Major: evolution elective II 3
Major: experiential elective or elective course 3-4
GE: Values and Culture 3
Elective course 3
Elective course 3

Hours 15-16

Total Hours 123-135

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2 Students may use their elective courses to complete a double major, minors, or certificates.

3 Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

4 Enrollment in chemistry and math courses require completion of placement exams.

5 Biochemistry option can be one semester of BIOC:3110 Biochemistry or two semesters of BIOC:3120 Biochemistry and Molecular Biology I and BIOC:3130 Biochemistry and Molecular Biology II.

Genetics and Biotechnology Track

<table>
<thead>
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<th>Hours</th>
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<tbody>
<tr>
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<td>Principles of Chemistry I (GE: Natural Sciences with a lab)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa (required)</td>
<td>2</td>
</tr>
</tbody>
</table>

Hours 16-18

Spring
BIOL:1411 | Foundations of Biology (GE: Natural Sciences with a lab) | 4 |
CHEM:1120 | Principles of Chemistry II (GE: Natural Sciences with a lab) | 4 |
MATH:1460 | Calculus for the Biological Sciences (GE: Quantitative or Formal Reasoning) | 4 |
GE: World Languages or elective course | 3-5 |

Hours 15-17

Second Year
Fall
BIOL:1412 | Diversity of Form and Function | 4 |
CHEM:2210 | Organic Chemistry I | 3 |
Major: statistics course | 3 |
GE: World Languages or elective course | 3-5 |
Elective course | 2-3 |

Hours 15-18

Spring
BIOL:2512 | Fundamental Genetics | 4 |
PHYS:1511 | College Physics I | 4 |
GE: Social Sciences | 3 |
GE: World Languages or elective course | 3-5 |
Elective course | 1 |

Hours 15-17

Third Year
Fall
BIOL:3172 | Evolution | 4 |
ENGL:1200 | The Interpretation of Literature (GE: Interpretation of Literature) | 3 |
PHYS:1512 | College Physics II | 4 |
Major: biochemistry course option | 3 |
Elective course | 1 |

Hours 15

Spring
BIOL:3314 | Genomics | 3 |
BIOL:3716 | Genetics and Biotechnology Lab | 4 |
Major: biochemistry course option | 3 |
GE: International and Global Issues | 3 |
Elective course | 2-3 |

Hours 15-16

Fourth Year
Fall
BIOL:3713 | Molecular Genetics | 4 |
Major: experiential elective or elective course | 3-4 |
Major: genetics and biotechnology elective I | 3 |
GE: Historical Perspectives | 3 |
GE: Literary, Visual, and Performing Arts | 3 |

Hours 16-17

Spring
Major: genetics and biotechnology elective II | 3 |
Major: experiential elective or elective course | 3-4 |
GE: Values and Culture | 3 |
Elective course | 3 |
Elective course | 3 |

Hours 15-16

Total Hours 122-134

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Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

Enrollment in chemistry and math courses require completion of placement exams.

Biochemistry option can be one semester of BIOC:3110 Biochemistry or two semesters of BIOC:3120 Biochemistry and Molecular Biology I and BIOC:3130 Biochemistry and Molecular Biology II.

### Neurobiology Track

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<tr>
<td>Hours</td>
<td>16-18</td>
<td></td>
<td></td>
</tr>
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</table>

| Spring           | BIOL:1411 | Foundations of Biology (GE: Natural Sciences with a lab) | 4     |
| CHEM:1120       | Principles of Chemistry II (GE: Natural Sciences with a lab) | 4     |
| MATH:1460       | Calculus for the Biological Sciences (GE: Quantitative or Formal Reasoning) | 4     |
| GE: World Languages or elective course | 3-5   |
| Hours           | 15-17     |

| Second Year Fall | BIOL:1412 | Diversity of Form and Function | 4     |
| CHEM:2210       | Organic Chemistry I | 3     |
| Major: statistics course | 3     |
| GE: World Languages or elective course | 3-5   |
| Elective course | 2-3      |
| Hours           | 15-18     |

| Spring           | BIOL:2512 | Fundamental Genetics | 4     |
| PHYS:1511       | College Physics I | 4     |
| GE: Social Sciences | 3     |
| GE: World Languages or elective course | 3-5   |
| Elective course | 1        |
| Hours           | 15-17     |

| Third Year Fall | BIOL:2753 | Introduction to Neurobiology | 3     |
| BIOL:3244      | Animal Behavior | 5     |
| ENGL:1200      | The Interpretation of Literature (GE: Interpretation of Literature) | 3     |
| PHYS:1512      | College Physics II | 4     |
| Hours           | 15        |

| Spring           | BIOL:3253 | Neurobiology | 4     |
| BIOL:3656       | Neurobiology Laboratory | 4     |
| Major: biochemistry course option | 3   |
| GE: International and Global Issues | 3   |
| Elective course | 1        |
| Hours           | 15        |

| Fourth Year Fall | BIOL:3172 | Evolution | 4     |
| Major: biochemistry course option | 3   |
| Major: experiential elective or elective course | 3-4 |
| Major: neurobiology elective I | 3     |
| GE: Historical Perspectives | 3     |
| Hours           | 16-17     |

| Spring           | Major: experiential elective or elective course | 3-4   |
| Major: neurobiology elective II | 3     |
| GE: Literary, Visual, and Performing Arts | 3     |
| GE: Values and Culture | 3   |
| Elective course | 3        |
| Hours           | 15-16     |

| Total Hours      | 122-133   |

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### Plant Biology Track

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<td></td>
</tr>
</tbody>
</table>

| Spring           | BIOL:1411 | Foundations of Biology (GE: Natural Sciences with a lab) | 4     |
| CHEM:1120       | Principles of Chemistry II (GE: Natural Sciences with a lab) | 4     |
| Major: experiential elective or elective course | 3-4 |
| Major: neurobiology elective I | 3     |
| GE: Historical Perspectives | 3     |
| Hours           | 15-16     |

| Total Hours      | 122-133   |

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### Second Year

#### Fall
- **BIOL:1412** Diversity of Form and Function  
- **CHEM:2210** Organic Chemistry I  
- Major: statistics course  
- **GE: World Languages or elective course**  
- **Elective course**  
- **Hours**  

#### Spring
- **BIOL:2512** Fundamental Genetics  
- **PHYS:1511** College Physics I  
- **GE: World Languages or elective course**  
- **Elective course**  
- **Hours**

### Third Year

#### Fall
- **BIOL:3663** Plant Response to the Environment  
- **ENGL:1200** The Interpretation of Literature  
- **PHYS:1512** College Physics II  
- Major: biochemistry course option  
- **Elective course**  
- **Hours**

#### Spring
- **BIOL:3172** Evolution  
- **BIOL:3363** Plant Developmental Biology  
- Major: biochemistry course option  
- **GE: International and Global Issues**  
- **Elective course**  
- **Hours**

### Fourth Year

#### Fall
- Major: experiential elective or elective course  
- Major: investigative laboratory for elective course  
- Major: plant biology elective I  
- **GE: Historical Perspectives**  
- **Elective course**  
- **Hours**

#### Spring
- Major: experiential elective or elective course  
- Major: investigative laboratory for elective course  
- Major: plant biology elective II  
- **GE: Literary, Visual, and Performing Arts**  
- **GE: Values and Culture**  
- **Hours**

### Career Advancement

The major in biology prepares students to enter research or service careers associated with private industry or government programs and for primary and secondary school teaching. It also prepares them to enter advanced degree programs leading to careers in higher education and to independent research in a variety of biological fields, or for practice in health professions such as medicine, dentistry, pharmacy, nursing, veterinary medicine, medical technology, and physical therapy.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

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