BIOLOGY UNDERGRADUATE MAJOR (BS, HBS)

This major offers the following option(s):

- Genetics (http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/genetics-option/)
- Physiology and Behavior (http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/physiology-behavior-option/)
- Pre-Dentistry/Biology (http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/pre-dentistrybiology-option/)
- Pre-Education Biology (http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/pre-education-biology-option/)
- Pre-Medicine/Biology (http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/pre-medicinebiology-option/)
- Pre-Veterinary Medicine (http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/biology-bs-hbs/pre-veterinary-medicine-option/)

Also available at OSU-Cascades.

Administered by the Department of Integrative Biology under the School of Life Sciences.

The undergraduate BS degree in Biology is designed for students seeking an interdisciplinary background in the life sciences. The major couples a comprehensive biological, physical and quantitative sciences core with an interdisciplinary background in the life sciences. The major couples a comprehensive biological, physical and quantitative sciences core with an interdisciplinary background in the life sciences.


Major Code: 509

- Explain and apply the fundamental concepts of the biological sciences, including inquiry in these four areas: PO1-A Cell Biology and Biochemistry; PO1-B Molecular Biology and Genetics; PO1-C Organismal Biology; and PO1-D Ecology and Evolution.
- Explain and apply the fundamental concepts in cell biology and biochemistry.
- Explain and apply the fundamental concepts in molecular biology and genetics.
- Explain and apply fundamental concepts in organismal biology.
- Explain and apply fundamental concepts in population genetics, evolution and ecology.
- Apply the process of science through three different aspects.
- Access primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.
- Formulate testable hypotheses based on observation, gather data to address these hypotheses and analyze those data to assess the degree to which their hypothesis is supported.
- Employ fundamental quantitative and statistical principles to present and critique scientific findings.
- Communicate scientific information through effective formal and informal writing and speaking in a format used by practicing scientists.
- Integrate and analyze information across levels of organization ranging from biochemistry and molecular biology to ecosystems within the biological sciences to formulate arguments and critically evaluate scientific claims.
- Conduct background research and apply fundamental biological science principles to make informed decisions on socio-scientific issues.

Students in the Biology major must complete BI 221, BI 222 and BI 223 (or the honors version of this series) with a C- or better to continue on to upper-division Biology (BI) and Zoology (Z) coursework. Students must also complete CH 231/CH 261, CH 232/CH 262 or CH 233/CH 263 and CH 331 and CH 332 with a C- or better to continue on to upper-division Chemistry (CH) coursework.

Students majoring in Biology cannot seek a dual or double major in Biochemistry and Biophysics, Biochemistry and Molecular Biology, Biohealth Sciences, Microbiology or Zoology.

Declaring an option can modify the statistics and elective areas of the major. For further information, see MyDegrees or the Integrative Biology (http://ib.oregonstate.edu) website.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BI 197</td>
<td>PROFESSIONAL DEVELOPMENT I: HEALTH PROFESSIONS</td>
<td>1</td>
</tr>
<tr>
<td>or BI 198</td>
<td>PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY</td>
<td></td>
</tr>
<tr>
<td>BI 298</td>
<td>PROFESSIONAL DEVELOPMENT FOR BIOLOGISTS II</td>
<td>1</td>
</tr>
</tbody>
</table>

Biology Core Courses

Biology Seminars:

- BI 197: PROFESSIONAL DEVELOPMENT I: HEALTH PROFESSIONS (1 credit)
- or BI 198: PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY
- BI 298: PROFESSIONAL DEVELOPMENT FOR BIOLOGISTS II (1 credit)
Select one BCC course from the following or see option:

**Biology and Society**

- **MB 303**
- **MB 302**
- **BB 314**
- **BI 311**
- **BI 370**
- **& BI 223**
- **& BI 222**
- **BI 221**

These courses are arranged in the order they are generally taken:

**Biological Sciences Core**

- **CH 231**
- **& CH 261**
- **& CH 262**
- **& CH 233**
- **& CH 263**
- **CH 331**
- **& CH 332**
- **& CH 337**
- **BB 450**
- **BB 451**

**Chemistry Core**

- **MTH 251**
- **& MTH 252**
- **or MTH 227**
- **& MTH 228**
- **ST 351**
- **ST 352**
- **or ST 411**
- **& ST 412**

**Mathematics and Statistics Core**

- **ST 351**
- **ST 352**
- **or ST 411**
- **& ST 412**

- **BB 332**
- **BB 331**
- **AEC 352/ECON 352**
- **AEC 351**
- **BB 314**
- **MB 303**
- **MB 302**
- **BB 314**
- **& BB 451**

**Baccalaureate Core Communications**

- **COMM 111**
- **WR 327**
- **or WR 362**

**Baccalaureate Core Writing II**

- **WR 327**
- **or WR 362**

**Electives**

Select one course from the following or see option:

- **AEC 351**
- **AEC 352/ECON 352**
- **BB 331**
- **BB 332**
- **BI 175**
- **BI 301**
- **BI 306**
- **BI 345**
- **BI 347**
- **BI 348**
- **BI 420**
- **BOT 324**
- **FES 435/TOX 435**
- **FW 350**
- **H 312**
- **HSTS 416**
- **MB 330**
- **PHL 443/REL 443**
- **Z 349**

**Electives**

Select two additional courses from the following:

- **BB 485**
- **BB 491**
- **BI 456**
- **BI 481**
- **BI 483**
- **BOT 458**
- **BOT 460**
- **BOT 475**
- **BOT 476**
- **FW 433**
- **GEOG 361**
- **GEOG 362**
- **OC 449**
- **ST 431**
- **ST 435**

Other courses by approval

**Organismal Biology**

Select one course from the following or see option:

- **Z 361**
- **Z 362**
- **Z 371**
- **Z 372**
- **Z 422**
- **Z 461**
- **Z 460**
- **Z 477**

**Physiology**

Select one course from the following or see option:

- **BI 331**
- **BI 341**
- **BI 332**
- **BB 319**

**Writing Intensive Course (WIC)**

Select one course from the following or see option:

- **BI 319**
### Biology Undergraduate Major (BS, HBS)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BI 371</td>
<td>*ECOLOGICAL METHODS</td>
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<tr>
<td>BI 373</td>
<td>*FIELD METHODS IN MARINE ECOLOGY</td>
</tr>
<tr>
<td>BOT 232</td>
<td>*FLOWERING PLANTS OF THE WORLD</td>
</tr>
<tr>
<td>MB 385</td>
<td>*EMERGING INFECTIOUS DISEASES AND EPIDEMICS</td>
</tr>
</tbody>
</table>

**Experiential Learning or Integrative Biology Elective**

Select one of the following two tracks or an option: **3-4**

**Track I Experiential Learning Credits**

Select any combination of three credits from the following:

- BI 309  
  TEACHING PRACTICUM (by approval)
- BI 401  
  RESEARCH AND SCHOLARSHIP (by approval)
- BI 406  
  PROJECTS: CURATORIAL ASSISTANT (by approval)
- BI 409  
  ADVANCED TEACHING PRACTICUM (by approval)
- BI 410  
  INTERNSHIP (by approval)
- OSU international internships (INTL credits) by approval

**Track II Integrative Biology Course**

Select one course from the following:

- BI 333  
  ADVANCED HUMAN ANATOMY AND PHYSIOLOGY
- & BI 343  
  ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY
- BI 353  
  PACIFIC NORTHWEST COASTAL ECOSYSTEMS (taught at Hatfield Marine Science Center)
- BI 358  
  SYMBIOSES AND THE ENVIRONMENT
- BI 375  
  FIELD METHODS IN ECOLOGICAL RESTORATION (taught at OSU Cascades)
- BI 427  
  PALEOBIOLOGY (if not used above)
- BI 450  
  *MARINE BIOLOGY AND ECOLOGY (taught at Hatfield Marine Science Center)*
- BI 454  
  EVOLUTIONARY GENOMICS
- BI 456  
  PHYLOGENETICS (if not used above)
- BI 481  
  BIOGEOGRAPHY
- BI 483  
  POPULATION BIOLOGY (if not used above)
- BI 485  
  MONSTER BIOLOGY
- BI 495  
  DISEASE ECOLOGY
- Z 350  
  ANIMAL BEHAVIOR
- Z 361  
  INVERTEBRATE BIOLOGY
- & Z 362  
  INVERTEBRATE BIOLOGY LABORATORY (if not used above)
- Z 365  
  BIOLOGY OF INSECTS
- Z 371  
  VERTEBRATE BIOLOGY
- & Z 372  
  VERTEBRATE BIOLOGY LABORATORY (if not used above)
- Z 425  
  EMBRYOLOGY AND DEVELOPMENT (if not used above)
- Z 432  
  VERTEBRATE PHYSIOLOGY II
- & Z 442  
  VERTEBRATE PHYSIOLOGY LABORATORY
- Z 438  
  BEHAVIORAL NEUROBIOLOGY
- Z 473  
  HERPETOLOGY

**Total credits required for graduation**  **180**

* Baccalaureate Core Course (BCC)

A Writing Intensive Course (WIC)

1 Alternative series is ST 351, ST 411 and ST 412

2 Biology majors are required to take BI 498, a comprehensive, two-hour Biology Major Field Test (http://ib.oregonstate.edu/advising/MFT-info/), in their final OSU term (or spring term if they will graduate in summer) in order to graduate.

### Declaring an Option

Declaring an option will alter the elective categories below, and all options automatically clear the upper-division science electives requirement. See the individual options or MyDegrees for details. Biology and Society electives also count as BCC.

### Biology - TRACK I

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BI 197 or BI 198</td>
<td>1</td>
</tr>
<tr>
<td>PROFESSIONAL DEVELOPMENT I: HEALTH PROFESSIONS or PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY</td>
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<tr>
<td>CH 231</td>
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<tr>
<td>GENERAL CHEMISTRY</td>
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<tr>
<td>&amp; CH 261 &amp; &amp; MTH 111</td>
<td>4</td>
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<tr>
<td>COLLEGE ALGEBRA or ELEMENTARY FUNCTIONS</td>
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<tr>
<td>Bacc Core</td>
<td>3</td>
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<td>HHS 231</td>
<td>2</td>
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<tr>
<td>*LIFETIME FITNESS FOR HEALTH (or PAC Course)</td>
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<tr>
<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
<th>Winter</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CH 232</td>
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</tr>
<tr>
<td>GENERAL CHEMISTRY &amp; &amp; CH 262</td>
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<tr>
<td>and LABORATORY FOR CHEMISTRY 232</td>
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<tr>
<td>MTH 112</td>
<td>4</td>
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<tr>
<td>*ELEMENTARY FUNCTIONS</td>
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<tr>
<td>Two Bacc Core courses</td>
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<td><strong>Credits</strong></td>
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<tbody>
<tr>
<td>BI 298</td>
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<td>PROFESSIONAL DEVELOPMENT FOR BIOLOGISTS II</td>
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<tr>
<td>CH 233</td>
<td>5</td>
</tr>
<tr>
<td>GENERAL CHEMISTRY &amp; &amp; CH 263</td>
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<tr>
<td>and LABORATORY FOR CHEMISTRY 233</td>
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</tr>
<tr>
<td>MTH 251 or MTH 227</td>
<td>4</td>
</tr>
<tr>
<td>*DIFFERENTIAL CALCULUS or CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES I</td>
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<tr>
<td>Two Bacc Core courses</td>
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<tr>
<td><strong>Credits</strong></td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BI 221 &amp; &amp; MTH 252 or MTH 228</td>
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<tr>
<td>*PRINCIPLES OF BIOLOGY CELLS or CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II</td>
<td></td>
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<tr>
<td>Bacc Core</td>
<td>3</td>
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<tr>
<td><strong>Credits</strong></td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BI 222 &amp; &amp; MTH 252 or MTH 228</td>
<td>4</td>
</tr>
<tr>
<td>*PRINCIPLES OF BIOLOGY ORGANISMS or CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II</td>
<td></td>
</tr>
<tr>
<td>Bacc Core</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
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<thead>
<tr>
<th>Spring</th>
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<tbody>
<tr>
<td>BI 223 &amp; &amp; MTH 252 or MTH 228</td>
<td>4</td>
</tr>
<tr>
<td>*PRINCIPLES OF BIOLOGY POPULATIONS or CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II</td>
<td></td>
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<tr>
<td>Bacc Core</td>
<td>3</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>
### Third Year

#### Fall
- **BB 450**  
  **GENERAL BIOCHEMISTRY**  
  **Credits:** 4

Select one of the following:
- **BI 311**  
  **GENETICS**  
- **BB 314**  
  **CELL AND MOLECULAR BIOLOGY**  
- **BI 370**  
  **ECOLOGY**  
- **PH 201**  
  **GENERAL PHYSICS**  
  **Credits:** 5

Bacc Core  
  **Credits:** 3

#### Winter
- **BB 451**  
  **GENERAL BIOCHEMISTRY**  
  **Credits:** 3

Select one of the following:
- **BI 311**  
  **GENETICS**  
- **BB 314**  
  **CELL AND MOLECULAR BIOLOGY**  
- **BI 370**  
  **ECOLOGY**  
- **PH 202**  
  **GENERAL PHYSICS**  
  **Credits:** 5

Bacc Core  
  **Credits:** 3

#### Spring
Select one of the following:
- **BI 311**  
  **GENETICS**  
- **BB 314**  
  **CELL AND MOLECULAR BIOLOGY**  
- **BI 370**  
  **ECOLOGY**  
- **BI 445**  
  **EVOLUTION**  
- **PH 203**  
  **GENERAL PHYSICS**  
  **Credits:** 5

Bacc Core  
  **Credits:** 3

### Fourth Year

#### Fall
Select one of the following:
- **BI 311**  
  **GENETICS**  
- **BB 314**  
  **CELL AND MOLECULAR BIOLOGY**  
- **BI 370**  
  **ECOLOGY**  
- **BI 445**  
  **EVOLUTION**  
- **MB 302**  
  **GENERAL MICROBIOLOGY**  
  **Credits:** 3

**MB 303**  
  **GENERAL MICROBIOLOGY LABORATORY**  
  **Credits:** 2

Select one of the following:
- **Biology and Society**
- **Organismal Biology**
- **Physiology**
- **Writing Intensive Course**

Electives  
  **Credits:** 4

**Credits:** 15

#### Winter
Select one of the following:
- **Biology and Society**
- **Organismal Biology**
- **Physiology**
- **Writing Intensive Course**

Electives  
  **Credits:** 6

**Spring**
- **BI 498**  
  **SENIOR BIOLOGY FIELD TEST**  
  **Credits:** 0

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### Electives

**Credits:** 11-15

**Total Credits:** 180

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### Biology - TRACK II

#### First Year

#### Fall
- **BI 197**  
  **PROFESSIONAL DEVELOPMENT I: HEALTH PROFESSIONS**  
  **or BI 198**  
  **PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY**  
  **Credits:** 1

- **BI 221**  
  **PRINCIPLES OF BIOLOGY: CELLS**  
  **Credits:** 4

- **CH 231**  
  **GENERAL CHEMISTRY**  
  & **CH 261**  
  **LABORATORY FOR CHEMISTRY 231**  
  **Credits:** 5

- **Bacc Core**  
  **Credits:** 3

- **HHS 231**  
  **LIFETIME FITNESS FOR HEALTH**  
  **(or PAC Course)**  
  **Credits:** 1-2

**Credits:** 15

#### Winter
- **BI 222**  
  **PRINCIPLES OF BIOLOGY: ORGANISMS**  
  **Credits:** 4

- **CH 232**  
  **GENERAL CHEMISTRY**  
  & **CH 262**  
  **LABORATORY FOR CHEMISTRY 232**  
  **Credits:** 5

**Two Bacc Core courses**  
  **Credits:** 6

**Credits:** 17

#### Second Year

#### Fall
- **CH 331**  
  **ORGANIC CHEMISTRY**  
  **Credits:** 4

- **PH 201**  
  **GENERAL PHYSICS**  
  **Credits:** 5

- **MTH 252**  
  **INTEGRAL CALCULUS**  
  **or MTH 228**  
  **CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II**  
  **Credits:** 3

**Bacc Core**  
  **Credits:** 3

#### Winter
Select one of the following:
- **BI 311**  
  **GENETICS**  
- **BB 314**  
  **CELL AND MOLECULAR BIOLOGY**  
- **BI 370**  
  **ECOLOGY**  
- **CH 332**  
  **ORGANIC CHEMISTRY**  
- **PH 202**  
  **GENERAL PHYSICS**  
  **Credits:** 5

**Bacc Core**  
  **Credits:** 3

**Credits:** 16

#### Spring
Select one of the following:
- **BI 311**  
  **GENETICS**  
- **BB 314**  
  **CELL AND MOLECULAR BIOLOGY**  
- **BI 370**  
  **ECOLOGY**  
- **CH 337**  
  **ORGANIC CHEMISTRY LABORATORY**  
- **PH 203**  
  **GENERAL PHYSICS**  
  **Credits:** 5

**Bacc Core**  
  **Credits:** 3

**Credits:** 16
### Third Year

#### Fall
- **BB 450** GENERAL BIOCHEMISTRY 4
- **ST 351** INTRODUCTION TO STATISTICAL METHODS 4
- **Bacc Core** 3
- Select one of the following: 3-4
  - **BI 311** GENETICS
  - **BB 314** CELL AND MOLECULAR BIOLOGY
  - **BI 370** ECOLOGY
  - **BI 445** EVOLUTION

#### Winter
- **BB 451** GENERAL BIOCHEMISTRY 3
- **ST 352** INTRODUCTION TO STATISTICAL METHODS 4
- **Bacc Core** 3
- Select one of the following: 3-4
  - **BI 311** GENETICS
  - **BB 314** CELL AND MOLECULAR BIOLOGY
  - **BI 370** ECOLOGY
  - **BI 445** EVOLUTION

#### Spring
- **BI 311** GENETICS 3
- **BB 314** CELL AND MOLECULAR BIOLOGY 3
- **BI 370** ECOLOGY 3
- **BI 445** EVOLUTION 3
- Select one of the following: 3
  - Biology and Society
  - Organismal Biology
  - Physiology
  - Writing Intensive Course
- **MB 302** GENERAL MICROBIOLOGY 3
- **MB 303** GENERAL MICROBIOLOGY LABORATORY 2
- **Bacc Core** 3
- **Electives** 6-10
- **Credits** 14-15

### Fourth Year

#### Fall
- **BI 311** GENETICS 3
- **BB 314** CELL AND MOLECULAR BIOLOGY 3
- **BI 370** ECOLOGY 3
- **BI 445** EVOLUTION 3
- Select one of the following: 3
  - Biology and Society
  - Organismal Biology
  - Physiology
  - Writing Intensive Course
- **Bacc Core** 3
- **Electives** 6-10
- **Credits** 14

#### Winter
- **Select one of the following:** 3
  - Biology and Society
  - Organismal Biology
  - Physiology
  - Writing Intensive Course
  - Experiential Learning or Integrative Biology Elective
- **Electives** 3
- **Credits** 14

#### Spring
- **BI 498** SENIOR BIOLOGY FIELD TEST 0
- **Select one of the following:** 3
  - Biology and Society
  - Organismal Biology
  - Physiology

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### Biology - TRACK III

#### First Year

#### Fall
- **BI 197** PROFESSIONAL DEVELOPMENT I: HEALTH or **BI 198** PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY 1
- **BI 221** *PRINCIPLES OF BIOLOGY CELLS 4
- **CH 231** GENERAL CHEMISTRY 5
- **ST 351** INTRODUCTION TO STATISTICAL METHODS 4
- **MB 302** GENERAL MICROBIOLOGY 3
- **MB 303** GENERAL MICROBIOLOGY LABORATORY 2
- **Bacc Core** 3
- **Electives** 6-10
- **Credits** 17

#### Winter
- **BI 222** *PRINCIPLES OF BIOLOGY ORGANISMS 4
- **CH 232** GENERAL CHEMISTRY 5
- **CH 262** GENERAL CHEMISTRY 3
- **Experiential Learning or Integrative Biology Elective** 3
- **Electives** 6-10
- **Credits** 15

#### Spring
- **BI 298** PROFESSIONAL DEVELOPMENT FOR BIOLOGISTS II 1
- **BI 223** *PRINCIPLES OF BIOLOGY POPULATIONS 4
- **CH 233** GENERAL CHEMISTRY 5
- **CH 263** GENERAL CHEMISTRY 3
- **MTH 251** *DIFFERENTIAL CALCULUS or **MTH 227** 4
- **Bacc Core** 3
- **Electives** 6-10
- **Credits** 15

### Second Year

#### Fall
- **Select one of the following:** 3-4
  - **BI 311** GENETICS
  - **BB 314** CELL AND MOLECULAR BIOLOGY
  - **BI 370** ECOLOGY
  - **BI 445** EVOLUTION
  - **CH 331** ORGANIC CHEMISTRY
  - **MTH 252** INTEGRAL CALCULUS or **MTH 228** 4
- **Bacc Core** 3
- **Electives** 6-10
- **Credits** 15

#### Winter
- **Select one of the following:** 3-4
  - **BI 311** GENETICS
  - **BB 314** CELL AND MOLECULAR BIOLOGY
  - **BI 370** ECOLOGY
  - **BI 445** EVOLUTION
  - **CH 332** ORGANIC CHEMISTRY
  - **ST 351** INTRODUCTION TO STATISTICAL METHODS
- **Bacc Core** 3
- **Electives** 6-10
- **Credits** 15

#### Spring
- **Select one of the following:** 3-4
  - **BI 311** GENETICS
  - **BB 314** CELL AND MOLECULAR BIOLOGY
  - **BI 370** ECOLOGY
  - **BI 445** EVOLUTION

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### Total Credits
- **180-181**
### Biology Undergraduate Major (BS, HBS)

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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CH 337</td>
<td>ORGANIC CHEMISTRY LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>ST 352</td>
<td>INTRODUCTION TO STATISTICAL METHODS</td>
<td>4</td>
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#### Third Year

**Fall**

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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
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**Credits** 16

**Winter**

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**Credits** 14

**Spring**

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**Credits** 16

**Fourth Year**

**Fall**

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**Credits** 13

**Winter**

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**Credits** 14

**Spring**

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**Credits** 15

**Total Credits** 180