This program was approved for students entering the university in the Summer 2022–Spring 2023 catalog year. For more information about catalog year, go to Catalog Year Information (http://catalog.louisville.edu/undergraduate/university-wide-unit-specific-policies/catalog-year/).

**Bachelor of Science in Biology**

Unit: College of Arts and Sciences (AS) (http://www.louisville.edu/a-s/)
Departmental Website: Biology (http://www.louisville.edu/a-s/biology/)
Academic Plan Codes: See Track Requirements tab.

**Program Information**

There are two undergraduate degree programs offered in the Biology Department, a Bachelor of Arts (BA) in Biology and a Bachelor of Science (BS) in Biology.

Bachelor of Science degrees are designed so that students get a particularly strong background in their area of interest in biology, cell/physiology, or ecology, but still have some flexibility to take courses of interest. Compared to the BA degree, the BS degree requires more science, both in biology and in another field (physics or geosciences), a specific calculus course, and one less course in a foreign language.

Each of the tracks in the BS degree also requires courses specific to the field of interest. BS degrees are valuable for students wanting to find employment in a biological field without further formal education, for students planning to attend graduate or professional school, and for students who hope to become teachers.

Completion of this degree requires work to be submitted for the department’s Learning Outcomes Measurement. For details, email the department.

**Degree Summary**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (<a href="http://catalog.louisville.edu/undergraduate/general-education-requirements/">http://catalog.louisville.edu/undergraduate/general-education-requirements/</a>)</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>(10 hours of General Education requirements may be satisfied through coursework required by the degree program)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College/School Requirements</td>
<td>13-15</td>
<td></td>
</tr>
<tr>
<td>Program/Major Requirements</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Supporting Courses</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Track Requirements</td>
<td>38-40</td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Total Hours</strong></td>
<td><strong>121</strong></td>
<td></td>
</tr>
</tbody>
</table>

1. Some courses required in this degree program may satisfy multiple requirements. To complete the degree in the **minimum number of hours** listed, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program. Using other courses to satisfy General Education requirements will require additional hours to complete the degree requirements. See the Degree Requirements and Track tabs for specific coursework.

Specific coursework information can be found on the Degree Requirements tab.

**Accelerated BA-BS/MS in Biology**

Biology majors who are considering pursuing a non-thesis master’s degree (MS) in Biology can speed up the process by applying some of their undergraduate credit hours toward a master’s degree. Students accepted into the Accelerated BA-BS/MS program take three graduate courses (9 credit hours) as an undergraduate that apply toward both the bachelor’s degree and the eventual master’s degree.

**Early Start Program (with the College of Education and Human Development)**

The Master of Arts in Teaching program in conjunction with the undergraduate programs in Chemistry, Biology, and Mathematics offers a comprehensive and professionally-focused program leading to an additional degree of MAT Middle or Secondary Education. This early start program enables superior students to receive two degrees within five years. A total of 148 credits are required for the dual degrees: 121 credits of coursework devoted toward the baccalaureate degree and 36 credits toward the MAT, with nine hours double-counted. This program will be available for students who are entering their junior year. They may take graduate level courses in the College of Education and Human Development (CEHD) in their 4th year of study.

The current qualifications for the joint degree program have been agreed upon by discipline faculty from the Colleges of Arts and Sciences and Education and Human Development. The criteria vary by discipline. Students enrolling in the accelerated program will be non-thesis students and must adhere to all policies pertaining to Graduate Students. All interested students must submit an application to the College of Education and Human Development (CEHD) MAT program and meet the admission criteria.

**Departmental Admission Requirements**

Admission to the Bachelor of Science in Biology requires the following:

- Completion of BIOL 240, BIOL 241, BIOL 242, and BIOL 243 with a grade of C or better.
- Completion of MATH 111 with a grade of C or better OR placement into a mathematics course above the level of MATH 111 on the basis of either the University of Louisville mathematics placement examination or ACT/SAT score.
- A minimum overall grade point average (GPA) of 2.0.

The Application for Major form can be found on the Arts & Sciences Advising Center website (http://louisville.edu/artsandsciences/advising/apply/).
General Education Requirements

**Code** | **Title** | **Hours**
---|---|---
| General Education Requirements (http://catalog.louisville.edu/undergraduate/general-education-requirements/)* | | 31

The following courses are required by the program and can satisfy the respective General Education Requirement:

- BIOL 240: Unity of Life - S
- or BIOL 242: Diversity of Life - S
- BIOL 241: Experimental Biology I: Molecules and Cells - SL
- or BIOL 243: Experimental Biology II: Organismal Biology - SL
- MATH 205: Calculus I - QR
- CHEM 201: General Chemistry I - S

*All degrees require the completion of the University-wide General Education Program (link provided above). To complete the degree in the minimum number of hours listed on the Overview tab, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program. If additional hours taken within the program also satisfy General Education requirements, students may need to take additional electives to satisfy the minimum hours required for the degree.

College/School Requirements

**Code** | **Title** | **Hours**
---|---|---
| Arts & Sciences Requirements | | 
| GEN 100: Student Success Center First Year Experience | | 1
| or GEN 101: Arts & Sciences First Year Experience | | 
| Foreign Language | | 6-8
| Electives in Humanities or Social Sciences at the 300-level or above | | 2-6
| WR - two approved courses at the 300 level or above | | 3

**Minimum Total Hours**: 13-15

Program/Major Requirements

**Code** | **Title** | **Hours**
---|---|---
| Department of Biology | | 
| BIOL 240: Unity of Life - S | | 3
| BIOL 241: Experimental Biology I: Molecules and Cells - SL | | 1
| BIOL 242: Diversity of Life - S | | 3
| BIOL 243: Experimental Biology II: Organismal Biology - SL | | 1
| BIOL 329: Cellular and Molecular Biology | | 3
| BIOL 330: Genetics and Molecular Biology | | 3
| BIOL 331: Genetics and Molecular Biology: Laboratory | | 2
| BIOL 363: Principles of Ecology | | 3
| BIOL 409: Evolutionary Biology - CUE | | 3

**Minimum Total Hours**: 22

**Code** | **Title** | **Hours**
---|---|---
| Supporting Courses | | 
| MATH 205: Calculus I - QR | | 4
| BIOL 350: Biostatistics | | 3
| CHEM 201: General Chemistry I - S | | 3
| CHEM 202: General Chemistry II - S | | 3
| CHEM 207 & CHEM 208: Introduction to Chemical Analysis I & SL | | 2

BS in Biology Tracks

**Track in Molecular, Cellular, and Developmental Biology**

**Academic Plan Code(s)**: BIOLBS_MCD

**Code** | **Title** | **Hours**
---|---|---
| Supporting Courses | | 
| CHEM 342: Organic Chemistry II | | 5
| & CHEM 344: Organic Chemistry Laboratory II | | 
| PHYS 222: Fundamentals of Physics II - S | | 4
| & PHYS 224: Fundamentals of Physics Laboratory II - SL | | 
| BIOL 457: Microbiology | | 3
| BIOL 443: Developmental Biology - CUE | | 3
| BIOL 465: Principles of Physiology | | 3
| BIOL 540: Metabolic Biochemistry | | 3
Molecular, Cellular, and Developmental Biology Laboratory Experience 1-4

Select one of the following:

- BIOL 458 Microbiology Laboratory
- BIOL 404 Undergraduate Research
  or BIOL 405 Undergraduate Research - CUE
  or BIOL 406 Undergraduate Research (WR) - WR, CUE
- BIOL 416 Biotechnology Methods - WR
- BIOL 541 Medicinal Plant Biochemistry - WR, CUE
- BIOL 548 Experimental Design and Analysis - CUE, WR

Molecular, Cellular, and Developmental Biology Track Electives 9-10

Select at least three courses from the following:

- BIOL 347 Comparative Vertebrate Anatomy
- BIOL 359 Microbial Genetics and Pathogenesis - WR
- BIOL 415 Biology of the Cell - WR, CUE
- BIOL 435 Chemical Ecology - WR
- BIOL 480 Introduction to Immunology - WR
- BIOL 485 Microbial Physiology - CUE, WR
- BIOL 511 Behavioral Endocrinology - WR, CUE
- BIOL 512 Endocrinology
- BIOL 515 Environmental Physiology
- BIOL 542 Gene Structure and Function - WR
- BIOL 552 Evolutionary Medicine
- BIOL 553 Chronic Disease Biology

Biology Electives (300 level or higher) 5-7

Minimum Total Hours 38-40

Flight Plan

Track in Ecology

Academic Plan Code(s): BIOLBS_ECO

Course Title Hours

Supporting Courses

Select two of the following courses: 5-6

- ENVS 301 Geology for Scientists and Engineers
- ENVS 363 Climate Science
- ENVS 365 Biogeography
- ENVS 367 Geomorphology
- GEOG 355 Introduction to Remote Sensing
- GEOG 558 Introduction to Geographic Information Systems
- SUST 518 Urban Demography and GIS

Select one of the following two sequences: 4-5

- PHYS 222 Fundamentals of Physics II - S
  & PHYS 224 Fundamentals of Physics Laboratory II - SL
- CHEM 342 Organic Chemistry II
  & CHEM 344 Organic Chemistry Laboratory II

Ecology Track Core Courses

- BIOL 401 Advanced Ecology 3
- BIOL 563 Population and Community Ecology 3

Ecology Track Electives

Select at least one course from each of the following three categories

Plant Ecology

- BIOL 300 Plant Biology - WR

Animal Ecology

- BIOL 304 Plant Taxonomy & Ecology - WR
- BIOL 435 Chemical Ecology - WR

Community Ecology

- BIOL 372 Evolutionary Ecology of Disease
- BIOL 440 Global Change Ecology - CUE
- BIOL 560 Ecology of Urban and Suburban Landscapes
- BIOL 562 Ecosystems Ecology
- BIOL 567 Conservation Biology

Minimum Total Hours 38-40
Biology MCD Elective 1 (choose one)
BIOL 350 Biotechnology Methods - WR
BIOL 416 Biotechnology Methods - WR
BIOL 542 Gene Structure and Function - WR
BIOL 552 Evolutionary Medicine
BIOL 553 Chronic Disease Biology

Year 3
Fall
BIOL 409 Microbiology Laboratory
BIOL 404 Undergraduate Research
BIOL 405 Undergraduate Research - CUE
BIOL 406 Undergraduate Research (WR) - WR, CUE
BIOL 416 Biotechnology Methods - WR
BIOL 541 Medicinal Plant Biochemistry - WR, CUE
BIOL 548 Experimental Design and Analysis - CUE, WR

Hours 17

Year 4
Spring
BIOL 465 Principles of Physiology
BIOL 350 Biostatistics

Hours 14-16

Track in Ecology

Course Title Hours
Year 1
Fall
GEN 100 Student Success Center First Year Experience or GEN 101 Arts & Sciences First Year Experience 1
BIOL 240 Unity of Life - S 1 3
BIOL 241 Experimental Biology I: Molecules and Cells - SL 1
CHEM 201 General Chemistry I - S 1
& CHEM 207 Introduction to Chemical Analysis I - SL 1
& CHEM 208 Introduction to Chemical Analysis II - SL 1
Foreign Language 2 2 3-4
ENGL 101 Introduction to College Writing - WC 3

Hours 16-17

Spring
BIOL 242 Diversity of Life - S 1 3
BIOL 243 Experimental Biology II: Organismal Biology - SL 1
CHEM 202 General Chemistry II - S 4
& CHEM 209 Introduction to Chemical Analysis III 3-4
Foreign Language 2 2 3-4
ENGL 102 Intermediate College Writing - WC 3

Hours 14-15

1 Fulfills the requirement for one of two required Gen Ed courses. However, only one Gen Ed course from each program will be counted towards your degree.
2 Students with high school language experience or multilingual backgrounds should consult the Classical and Modern Languages department for information on partially or completely satisfying the language requirements through testing.
3 This is a good time to think about performing undergraduate research. Look at faculty websites here and at the HSC, then email faculty whose research you find interesting. See if they have openings.
4 Biology WR courses that fit well in this track include: BIOL 359, BIOL 415, BIOL 416, BIOL 480, BIOL 485, BIOL 511, BIOL 541, and BIOL 542 but note that only some of these are offered in a given semester. BIOL 406 (undergraduate research) would be appropriate if you plan to do an honors project, and is also a good source of writing credit. You MUST have mentor approval.
<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 329</td>
<td>Cellular and Molecular Biology</td>
</tr>
<tr>
<td>PHYS 221</td>
<td>Fundamentals of Physics I - S</td>
</tr>
<tr>
<td>&amp; PHYS 223</td>
<td>Fundamentals of Physics Lab I - SL&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>MATH 205</td>
<td>Calculus I - QR</td>
</tr>
<tr>
<td>General Education: Cardinal Core Oral Communication - DC&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>General Education: Cardinal Core Social &amp; Behavioral Sciences US Diversity - SB1</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 330</td>
</tr>
<tr>
<td>BIOL 331</td>
</tr>
<tr>
<td>CHEM 341</td>
</tr>
<tr>
<td>&amp; CHEM 343</td>
</tr>
</tbody>
</table>

Choose one of the following:

- ENVS 301 Geology for Scientists and Engineers
- ENVS 367 Geomorphology

General Education: Cardinal Core Arts & Humanities Global Diversity - AH02<sup>1</sup> | 3 |

<table>
<thead>
<tr>
<th>Year 3</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 363</td>
<td>Principles of Ecology</td>
</tr>
<tr>
<td>BIOL 350</td>
<td>Biostatistics</td>
</tr>
<tr>
<td>Biology Ecology elective 1&lt;sup&gt;3&lt;/sup&gt;</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Choose one of the following:

- PHYS 222 Fundamentals of Physics II - S
- & PHYS 224 Fundamentals of Physics Laboratory II - SL<sup>1</sup> | 1 |
- CHEM 342 Organic Chemistry II
- & CHEM 344 Organic Chemistry Laboratory II

General Education: Cardinal Core Historical Perspective – SBH<sup>1</sup> | 3 |

<table>
<thead>
<tr>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 563</td>
</tr>
<tr>
<td>Biology Ecology elective 2&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Biology elective (300 level or above)&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Humanities/Social Science/Biology WR Course (300 level or above)&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>Humanities/Social Science/Biology elective (300 level or above)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 4</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 401</td>
<td>Advanced Ecology</td>
</tr>
<tr>
<td>BIOL 402</td>
<td>Advanced Ecology Lab</td>
</tr>
<tr>
<td>BIOL 409</td>
<td>Evolutionary Biology - CUE</td>
</tr>
<tr>
<td>Biology Ecology elective 3&lt;sup&gt;3&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>General Education: Cardinal Core Arts &amp; Humanities – AH&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology Ecology elective 4&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Biology elective</td>
</tr>
<tr>
<td>Biology/Geosciences Elective</td>
</tr>
</tbody>
</table>

Choose two of the following:

- GEOG 355 Introduction to Remote Sensing
- ENVS 360 Climate Science
- ENVS 365 Biogeography
- GEOG 558 Introduction to Geographic Information Systems
- SUST 518 Urban Demography and GIS

Humanities/Social Science/Biology WR Course (300 level or above)<sup>5</sup> | 3 |

| Minimum Total Hours | 125-131 |

1. Fulfill the requirement for one of two required Gen Ed courses. However, only one Gen Ed course from each program will be counted towards your degree.

2. Students with high school language experience or multilingual backgrounds should consult the Classical and Modern Languages department for information on partially or completely satisfying the language requirements through testing.

3. Track-specific Electives (choose 1 from each category and at least 1 additional class from these lists, 12 h):

**Category I: Plant Ecology**
- BIOL 300 WR – Plant Biology
- BIOL 304 WR – Plant Taxonomy
- BIOL 435 WR – Chemical Ecology

**Category II: Animal Ecology**
- BIOL 308 – Vertebrate Zoology
- BIOL 310 – Animal Behavior
- BIOL 347 – Comp. Vertebrate Anatomy
- BIOL 382 – Entomology
- BIOL 510 – Animal Behavior
- BIOL 514 – Ornithology
- BIOL 515 – Environmental Physiology
- BIOL 571 – Invertebrate Zoology

**Category III: Community Ecology**
- BIOL 372 – Evolutionary Ecology and Disease
- BIOL 440 – Global Change
- BIOL 560 – Urban Ecology
- BIOL 562 – Ecosystems Ecology
- BIOL 567 – Conservation Biology

4. This is a good time to think about performing undergraduate research. Look at faculty websites here and at the HSC, then email faculty whose research you find interesting. See if they have openings.

5. Biology courses often listed as WR that fit well in this track include: BIOL 304, BIOL 404, BIOL 405, BIOL 406, BIOL 415, BIOL 435, BIOL 443 but note that only some of these are offered in a given semester. BIOL 406 WR (undergraduate research) would be appropriate if you plan to do an honors project, and is also a good source of writing credit. You MUST have mentor approval.

**Degree Audit Report**

Degree Audit reports illustrate how your completed courses fulfill the requirements of your academic plan. What-if reports allow you to compare the courses you have completed in your current academic plan to the courses required in another academic plan. Should you have questions about either report, please consult with your academic advisor.

**To create either report:**

1. Log into your ULink account.
2. Click on the Academic Progress tile.
3. Next, click on "View my Degree Audit" to run a Degree Audit report in the Undergraduate Advising area.
4. To create a What-if report, click on "Create a What-if Advisement Report."

Click here to run a Degree Audit report, or create a What-if report. (https://ulink.louisville.edu)
Based on your major, the Flight Planner tool may be available for you to create a personalized Flight Plan. The Flight Planner can be found in the ULink Student Center. Consult with your advisor for assistance with the Flight Planner.