The undergraduate program in ecology and evolutionary biology offers a highly interactive, intellectual environment that prepares students for a career in the natural sciences.

Our program was specifically designed for students who are interested in a broad exposure to the concepts and methodologies of the biological sciences, as well as those interested in a more specific sub-discipline. We offer a broad range of learning opportunities, including traditional classroom experiences, field and laboratory research opportunities, and independent study.

**Requirements**

**AP & Transfer Credit**

Students with scores of 4 or 5 on the AP biology test receive 8 hours of credit and are exempt from the general biology sequence (EBIO 1210 and EBIO 1220, and EBIO 1230 and EBIO 1240). Students who score in the 66th percentile or higher on the CLEP test in biology receive 6 hours of credit and are exempt from EBIO 1210 and EBIO 1220.

EBIO majors with transfer credit in biology from other institutions or advanced placement credits must consult with the EBIO undergraduate advisor. Transfer students must complete at least 12 upper-division (3000-level or above) EBIO credit hours on the Boulder campus.

**Program Requirements**

In addition to the general College of Arts and Sciences requirements, students in EBIO must complete complete 9–15 credit hours in ancillary coursework, plus a statistics course and 38 credit hours of coursework in EBIO.

Up to 12 credit hours of courses taken in other departments may be counted toward the 38 credit hours required for the EBIO major. A list of acceptable courses can be obtained from the EBIO advisor. A maximum of 6 credit hours of Independent Study/Research may be applied toward the major. A maximum of 6 credit hours of internship may be applied toward the major.

All required major courses and all required ancillary courses must be passed with a C- or better and cannot be taken pass/fail. Students must have a grade point average of at least 2.000 in the major in order to graduate.

**Required Courses and Credits**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Introductory Biology Coursework</strong></td>
<td></td>
</tr>
<tr>
<td>EBIO 1210 &amp; EBIO 1230</td>
<td>General Biology 1 and General Biology Laboratory 1</td>
<td>8</td>
</tr>
<tr>
<td>EBIO 1220 &amp; EBIO 1240</td>
<td>General Biology 2 and General Biology Laboratory 2</td>
<td></td>
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<tr>
<td>EBIO 1250</td>
<td>Introduction to Ecology and Evolutionary Biology Research</td>
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<tr>
<td></td>
<td><strong>Required Major Courses</strong></td>
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<tr>
<td>EBIO 2040</td>
<td>Principles of Ecology</td>
<td>4</td>
</tr>
<tr>
<td>EBIO 2070</td>
<td>Genetics: Molecules to Populations</td>
<td>4</td>
</tr>
<tr>
<td>EBIO 3080</td>
<td>Evolutionary Biology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>One EBIO laboratory or field course, 3000 level or above. Possible choices include:</td>
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<tr>
<td>EBIO 3170</td>
<td>Mountain Ecology and Conservation</td>
<td></td>
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<tr>
<td>EBIO 3240</td>
<td>Animal Behavior</td>
<td></td>
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<tr>
<td>EBIO 3400</td>
<td>Microbiology</td>
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<tr>
<td>EBIO 3630</td>
<td>Parasitology</td>
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<tr>
<td>EBIO 3850</td>
<td>Animal Diversity: Invertebrates</td>
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<tr>
<td>EBIO 4100</td>
<td>Advanced Ecology</td>
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<tr>
<td>EBIO 4500</td>
<td>Plant Biodiversity and Evolution</td>
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<tr>
<td>EBIO 4510</td>
<td>Plant Anatomy and Development</td>
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<tr>
<td>EBIO 4520</td>
<td>Plant Systematics</td>
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<tr>
<td>EBIO 4660</td>
<td>Insect Biology</td>
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<tr>
<td>EBIO 4750</td>
<td>Ornithology</td>
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<tr>
<td>EBIO 4760</td>
<td>Mammalogy</td>
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<tr>
<td>EBIO 4000-level or above (at least 6 credit hours). Possible choices include:</td>
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<tr>
<td>EBIO 4030</td>
<td>Limnology</td>
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<tr>
<td>EBIO 4060</td>
<td>Landscape Ecology</td>
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<tr>
<td>EBIO 4140</td>
<td>Plant Ecology</td>
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<tr>
<td>EBIO 4100</td>
<td>Advanced Ecology</td>
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<tr>
<td>EBIO 4160</td>
<td>Introduction to Biogeochemistry</td>
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<tr>
<td>EBIO 4175</td>
<td>The Scientific Basis for Ecosystem Management of Public Lands</td>
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<tr>
<td>EBIO 4290</td>
<td>Phylogenetics and Comparative Biology</td>
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<tr>
<td>EBIO 4410</td>
<td>Biological Statistics</td>
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<tr>
<td>EBIO 4740</td>
<td>Biology of Amphibians and Reptiles</td>
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<tr>
<td>EBIO 4800</td>
<td>Critical Thinking in Biology</td>
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<tr>
<td>EBIO 4840</td>
<td>Independent Study: Upper Division</td>
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<tr>
<td>EBIO 4870</td>
<td>Independent Research: Upper Division</td>
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<tr>
<td></td>
<td><strong>Electives</strong></td>
<td>8-9</td>
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<tr>
<td></td>
<td>EBIO electives to bring total in major to 38 credit hours</td>
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<tr>
<td></td>
<td><strong>Total Credit Hours</strong></td>
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<tr>
<td></td>
<td><strong>Ancillary Mathematics/Science Coursework</strong></td>
<td>9-15</td>
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<tr>
<td></td>
<td><strong>Statistics</strong></td>
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<tr>
<td></td>
<td>EBIO 1010 Introduction to Statistics and Quantitative Thinking for Biologists</td>
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<td></td>
<td>IPHY 3280 Intro to Data Science and Biostatistics</td>
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<tr>
<td></td>
<td>MATH 2510 Introduction to Statistics</td>
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<td></td>
<td>MATH 3510 Introduction to Probability and Statistics</td>
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<td></td>
<td>PSYC 2111 Psychological Science I: Statistics</td>
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<tr>
<td></td>
<td>EBIO 4410 Biological Statistics</td>
<td>2</td>
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</tbody>
</table>

**Other Required Coursework**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td><strong>Mathematics</strong></td>
<td></td>
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<tr>
<td>MATH 1212</td>
<td>Data and Models</td>
<td></td>
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<tr>
<td></td>
<td><strong>Electives</strong></td>
<td>8-9</td>
</tr>
<tr>
<td></td>
<td>EBIO electives to bring total in major to 38 credit hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Credit Hours</strong></td>
<td>38</td>
</tr>
</tbody>
</table>
MATH 1150 Precalculus Mathematics
MATH 1300 Calculus 1
or MATH 1310 Calculus for Life Sciences
or APPM 1350 Calculus 1 for Engineers
MATH 2300 Calculus 2
or APPM 1360 Calculus 2 for Engineers
MATH 2380 Mathematics for the Environment

Chemistry
CHEM 1021 Introductory Chemistry
CHEM 1011 Environmental Chemistry 1
CHEM 1113 General Chemistry 1
& CHEM 1114 Foundations of Chemistry Lab
or CHEM 1400 General Chemistry 2
& CHEM 1401 Foundations of Chemistry Lab
CHEM 1133 General Chemistry 2
& CHEM 1134 Introduction to General Chemistry 2
CHEM 3151/ATOC 3500 Air Chemistry and Pollution
CHEM 4141 Environmental Water and Soil Chemistry

Physics
PHYS 1010 Physics of Everyday Life 1
PHYS 2010 General Physics 1
or PHYS 1110 General Physics 1
PHYS 2020 General Physics 2
or PHYS 1120 General Physics 2
& PHYS 1140 Experiments in Physics 1
PHYS/ENVS 3070 Energy and the Environment

Geology
GEOL 1010 Exploring Earth
& GEOL 1030 and Introduction to Geology Laboratory 1
or GEOL 1012 Exploring Earth for Scientists
& GEOL 1030 and Introduction to Geology Laboratory 1
GEOL 1020 Dodos, Dinos, and Deinococcus: The History of a Habitable Planet
GEOL 1150 Water, Energy and Environment: An Introduction to Earth Resources
GEOL 1170 Our Deadly Planet
GEOL 1180 Our Microbial Planet

Geography
GEOG 1001 Environmental Systems: Climate and Vegetation
GEOG 1011 Environmental Systems: Landscapes and Water
GEOG 2271 Introduction to the Arctic Environment

Atmospheric and Oceanic Sciences
GEOG 4103 Geographic Information Science: Spatial Analytics
GEOG 4203 Geographic Information Science: Spatial Modeling
GEOG 4303 Geographic Information Science: Spatial Programming
GEOG 4603 GIS in the Social and Natural Sciences

ATOC 1060 Our Changing Environment: El Nino, Ozone, and Climate
ATOC 3070 Introduction to Oceanography
ATOC 4200 Biogeochemical Oceanography
ATOC 3500/ CHEM 3151 Air Chemistry and Pollution

Computer Science
CSCI 1200 Introduction to Computational Thinking
CSCI 1300 Computer Science 1: Starting Computing

Total Credit Hours 13-15

1 These 6 credit hours must include one course taken at the CU Boulder campus, the Mountain Research Station or on a CU Boulder Global Seminar, and may include a maximum of 3 credit hours of independent study or independent research.
2 Of these, only EBIO 4410 counts toward the 38 credit hours of EBIO required for the major.
3 Students must take the lecture and lab for these courses.

Recommended Four-Year Plan of Study
Through the required coursework for the major, students will fulfill all 12 credits of the Natural Sciences area of the Gen Ed Distribution Requirement, including the Laboratory or Field Experience, and likely the QRMS component of the Gen Ed Skills Requirement.

Course Title Credit Hours

Year One
Fall Semester
EBIO 1210 General Biology 1 3
EBIO 1230 General Biology Laboratory 1 1
Gen. Ed. Skills course (example: Lower-division Written Communication) 3
Gen. Ed. Skills course (example: QRMS) 3
Elective/MAPS 3
Credit Hours 13

Spring Semester
EBIO 1220 General Biology 2 3
EBIO 1240 General Biology Laboratory 2 1
EBIO 1010 Introduction to Statistics and Quantitative Thinking for Biologists (or another statistics course) 3
Gen. Ed. Distribution/Diversity course (example: Social Sciences/US Perspective) 3
Elective/MAPS 3
Credit Hours 13

Year Two
Fall Semester
EBIO 2040 Principles of Ecology 4
EBIO Ancillary 5
Gen. Ed. Distribution course (example: Arts & Humanities) 3
Gen. Ed. Distribution course (example: Social Sciences) 3
Credit Hours 15

Spring Semester
EBIO Ancillary 5
EBIO Upper-Division 3-4
Gen. Ed. Distribution course (example: Social Sciences) 3
Elective/MAPS 3

Year Three
Fall Semester
EBIO 2070 Genetics: Molecules to Populations 4
EBIO Upper-Division 3-4
Gen. Ed. Distribution course (example: Social Sciences) 3
Gen. Ed. Distribution course (example: Arts & Humanities) 3
Upper-division Elective 3

Credit Hours 14-15

Spring Semester
EBIO 3080 Evolutionary Biology 4
EBIO Ancillary 5
Gen. Ed. Skills course (example: Upper-division Written Communication) 3
Upper-division Elective 3

Credit Hours 16-17

Year Four
Fall Semester
EBIO Upper-Division 4
EBIO Upper-Division 4
Gen. Ed. Distribution/Diversity course (example: Arts & Humanities/Global Perspective) 3
Upper-division Elective 3
Upper-division Elective 3

Credit Hours 15

Spring Semester
EBIO Upper-Division 4
EBIO Upper-Division 4
Gen. Ed. Distribution course (example: Arts & Humanities) 3
Upper-division
Upper-division Elective 3
Upper-division Elective 3

Credit Hours 17

Total Credit Hours 120-122

Learning Outcomes

In light of the broad importance of ecology and evolution for fundamental understanding of living systems, the undergraduate EBIO degree emphasizes knowledge and problem-solving in the following areas:
- The ecology of organisms, populations and communities
- The distribution and function of terrestrial, freshwater and marine ecosystems
- Principles and patterns of evolution, including natural selection and the history of life on Earth
- Comparative, systematic, evolutionary and environmental aspects of botany, microbiology and zoology
- Adaptation of organisms to the physical and biotic environment
- Animal behavior and emotion
- Molecular evolution and population genetics
- Developmental biology and the evolution of development
- Conservation biology and management of ecosystems
- The relevance of mathematics, chemistry and physics to biology
- The development of biological thought
- Infectious disease ecology
- Landscape and ecosystem ecology
- Sustainability and human-nature systems
- Energy and biofuels
- Darwinian medicine
- Health and population genetics
- Genetically-engineered organisms

Bachelor’s–Accelerated Master’s Degree Program(s)

The Bachelor’s–Accelerated Master’s (BAM) degree program options offer currently enrolled CU Boulder undergraduate students the opportunity to receive a bachelor’s and master’s degree in a shorter period of time. Students receive the bachelor’s degree first, but begin taking graduate coursework as undergraduates (typically in their senior year). Because some courses are allowed to double count for both the bachelor’s and the master’s degrees, students receive a master’s degree in less time and at a lower cost than if they were to enroll in a stand-alone master’s degree program after completion of their baccalaureate degree. In addition, staying at CU Boulder to pursue a bachelor’s–accelerated master’s program enables students to continue working with their established faculty mentors.

BA and MA in Ecology and Evolution Biology

A combined bachelor’s and master’s degree with a thesis is offered for highly motivated undergraduate students. The BAM program allows students to take advanced courses at an accelerated pace, engage in an independent research project and obtain both degrees in five years. In addition to preparing graduates for additional graduate study or medical school, the program is expected to position them for employment in areas such as environmental consulting, teaching at the high school or community college level or by businesses with an environmental or biomedical emphasis.

Admissions Requirements

In order to gain admission to the BAM program named above, a student must meet the following criteria:
- Have a cumulative GPA of 2.75 or higher
- Have a major GPA in EBIO of 3.0 or higher
- Have the support of a faculty research advisor
- Have completed a minimum of 12 credit hours of coursework
- Transfer students must have completed a minimum of 24 credit hours at CU Boulder
- Students must have completed prerequisite courses EBIO 2040, EBIO 2070 and EBIO 3080

Applications from sophomores and juniors for the BAM degree are considered on a competitive basis. Applications are available from the EBIO graduate coordinator, and are due on October 15 and March 15.

Program Requirements

Students may take up to and including 12 hours while in the undergraduate program which can later be used toward the master’s degree. However, only six undergraduate credits (at the 4000-level) may
be double counted toward the bachelor's degree and the master's degree. Students must apply to graduate with the bachelor's degree, and apply to continue with the master's degree, early in the semester in which the undergraduate requirements will be completed.

Students interested in this program are encouraged to consult with the EBIO associate chair for graduate studies early in their undergraduate career. No financial support is available from the department for students enrolled in this program.