

UNDERGRADUATE MAJOR IN ECOLOGY & EVOLUTIONARY BIOLOGY

I. General Requirements for the Major:

1. **A Total of 38 Credit Hours in the Major.** Courses listed under Major Coursework (excluding ancillary work) count toward the 38 hours, as do up to 12 hours of specified courses from other departments as listed on page 3. EBIO writing courses (EBIO 1950, 3940) and EBIO non-majors' coursework (EBIO 1030, 1040, 1050) may not be counted toward the 38 hours required for the major.
2. **At least 18 Credit Hours of Upper Division in the Major.** Courses numbered at the 3000 or 4000 level are considered upper division.
3. **Grades C- or above.** All *major* coursework, including ancillary work, must be completed with a grade of a C- or better.
4. **Pass/fail Option.** Students cannot use pass/fail coursework towards the major. The only exceptions are courses which the student had no option of taking for a grade (e.g. EBIO 3930 – Internship, and certain study abroad courses).

II. Major Coursework

1. EBIO Majors' Fundamentals Sequence

	Fall Semester	Spring Semester
Freshman Year	<i>EBIO 2050-Environmental Biology w/ lab</i>	<i>EBIO 2060-Cellular and Integrative Physiology w/ lab</i>
Sophomore Year	<i>EBIO 2070-Genetics: Molecules to Populations w/recitation</i>	<i>EBIO 2080-Evolutionary Biology w/ recitation</i>

2. Area Requirement (At least one course from 2 of the 3 lists)

- A. **Environmental biology:** Plant Ecology EBIO 3140 (3 credits), Population and Community Ecology EBIO 3155 (3 credits), Animal Behavior EBIO 3240 (4 credits), Conservation Biology EBIO 4040 (3 credits), Ecosystem Ecology EBIO 4170 (3 credits)
- B. **Integrative physiology:** Human Physiology EBIO 3430 (5 credits), Essentials of Plant Physiology EBIO 3530 (5 credits), Comparative Animal Physiology EBIO 3700 (5 credits)
- C. **Evolution/Genetics:** Plant Kingdom EBIO 3500 (4 credits), Plant Systematics EBIO 3520 (4 credits), Comparative Vertebrate Anatomy EBIO 3720 (5 credits), Invertebrate Zoology EBIO 3850 (4 credits)

3. Track Coursework

After completing the fundamentals sequence, students will have the option of choosing a track from the areas listed below. Tracks in areas not listed may also be individually designed in consultation with an advisor.

Evolution and Biodiversity

Plant Biology

Animal Biology

Conservation Biology

Environmental Management

Environmental Biology

Health Sciences

Integrative Physiology

Note: Track coursework must include six Credits at the 4000 Level in EBIO (courses with EBIO prefix only). These credits must be taken in the EBIO department on the Boulder campus. Cannot be satisfied by EBIO 4010, Study Abroad, or Semester at Sea credits. No more than three credit hours of independent study/research will count. Up to two Critical Thinking courses in EBIO can be counted.

4. Ancillary Sciences and Mathematics (not counted towards the major)

- A. **One Year of College Chemistry.** Recommended: CHEM 1111 + 1131. Also acceptable: CHEM 1111 + 1071, and CHEM 1151 + 1171. CHEM 1211 + CHEN 1221 can substitute for CHEM 1111.
- B. **One Year of College Physics.** Recommended: PHYS 2010 + 2020 (non-calculus based). Also acceptable: PHYS 1110 + 1120 + 1140 (calculus based).
- C. **One Semester of College Calculus.** Recommended: MATH 1310 (computer applications). Also acceptable: MATH 1300, APPM 1350. Math modules cannot be substituted.

III. Additional Information on the Major:

1. **Students entering the EBIO Major with prior credit for college-level biology courses.** The following outlines the protocol for students transferring into the new EBIO Majors' fundamentals sequence with prior credit for college-level biology courses:

- A. **Students who have taken EBIO 1210/1230** ("General Biology I," or a generally equivalent transfer course) and then decide to major in EBIO should take EBIO 1220/1240 "General Biology II" and then proceed as in Section B, below.
- B. **Students with credit for two semesters of general biology** who declare the EBIO major. This includes the following:
 - 1) Transfer students with credit for General Biology I & II.
 - 2) Students with AP credit for General Biology I & II.
 - 3) Students who declare EBIO major after having had EBIO 1210/1230 and EBIO 1220/1240, "General Biology I & II."

Such students have two options (the choice to be made with the assistance of an EBIO advisor):

- a) Take EBIO 2050 and/or EBIO 2060 and then take EBIO 2070 and EBIO 2080. (However, note that students will not receive credit for both EBIO 2050-2060 and EBIO 1210/1230 and EBIO 1220/1240 - that is, a student may count toward graduation no more than 8 credit hours from first-year biology courses. EBIO 2050 and 2060 will be considered repeats of EBIO 1210/1230 and EBIO 1220/1240)
 - b) Substitute EBIO 1210/1230 and EBIO 1220/1240 for EBIO 2050 and EBIO 2060 and then take EBIO 2070 and EBIO 2080.
- C. Students who declare the EBIO major after having had EBIO 1030-1040-1050 ("Biology: a Human Approach"), may waive EBIO 2050 and 2060 and then take EBIO 2070 and EBIO 2080. Note: students may not apply any credits from EBIO 1030-1040-1050 towards the EBIO major
- D. **Students changing majors from MCDB to EBIO.** For present purposes, MCDB 1150/1151 are considered to be the equivalent of EBIO 1210/1230 or EBIO 2060, and MCDB 2150/2151 are considered to be the equivalent of EBIO 2070.
 - 1) Students declaring a major in EBIO after having had only MCDB 1150/1151 should take EBIO 1220/1240 (Spring). Then taking EBIO 2070 and EBIO 2080.
 - 2) Students declaring a major in EBIO after having had both MCDB 1150/1151 and MCDB 2150/2151 should take EBIO 2050 (Fall) and EBIO 2080 (Spring).

2. **Department Overview.** The department has prepared a Department Overview handout for undergraduates that provides additional information on many topics. Copies are available in the department advising office.
3. **Advising.** Advisors are available in the Undergraduate Advising and Resource Center in Ramaley N122D. Faculty are available for advising as well.
4. **Honors** A handout with information on earning departmental honors is available at the Undergraduate Advising Center. Honors sections of the EBIO Majors' Core are available (EBIO 2650 and 2670 Fall, EBIO 2660 and 2680 Spring) These substitute for EBIO 2050, 2060, 2070, and 2080.
5. **Courses from other departments counted toward the 38 hours.** Certain courses from other departments (maximum of 12 credits) count toward the 38 hour requirement for the major in ECOLOGY & EVOLUTIONARY Biology. A list of these courses is on the next page.
6. **Transfer credit.** EBIO faculty advisors can pre-approve transfer courses before they are taken to make sure that they will count toward the major requirements (approval form available from in the Undergraduate Advising and Resource Center); however, transfer credit toward the EBIO major must have final approval by the College of Arts and Sciences. All transfer students must complete at least 12 credits of upper division EBIO courses on the Boulder campus to be eligible for the Bachelor's Degree.
7. **4-Year Guarantee.** The Department of ECOLOGY & EVOLUTIONARY Biology is a participant in the College of Arts & Science's 4-year guarantee program for the bachelor of arts degree. Students who wish to be eligible for this guarantee should read the descriptions of the 4-year guarantee prepared by the College and the Department. Students must follow the requirements of the College and of EBIO in order to remain eligible for the guarantee.

IV. Advice from the Faculty

The faculty recommend that students who plan careers in science consider taking additional course work in chemistry, mathematics, or statistics in order to meet the requirements of certain professional and graduate programs or to enhance the probability of having a successful career. Specific recommendations are as follows:

1. **Chemistry.** Chemistry course work beyond inorganic chemistry is extremely helpful to students who plan careers in medicine, oceanography, physiology, and related areas. Recommended: Organic Chemistry with Lab (CHEM 3311, 3321, 3331, 3341; note that a C- or better in either CHEM 1131, 1171, or 1211 is required before enrolling in Organic Chemistry I). Also useful: Biochemistry (CHEM 4711, 4731, 4761; note that these count toward the major, as shown on page 3).
2. **Mathematics.** Additional mathematics is important to students who plan careers in epidemiology, population biology, ecosystem science, or other synthetic disciplines. Especially useful course work would include MATH 2300, 2400, and APPM 3310.
3. **Statistics.** Statistical expertise is useful in many careers. Recommended course work includes any of the following: EBIO 4410, PSYC 2101, APPM 3570, and APPM 4570.

Courses in other departments that may be applied toward the EBIO major for a maximum of 12 hours (CU courses not listed here cannot be counted toward the major):

Anthropology

ANTH 3000 Primate Behavior
ANTH 3010 The Human Animal
ANTH 4080 Anthropological Genetics
ANTH 4110 Human Evolutionary Biology
ANTH 4120 Advanced Physical Anthropology
ANTH 4150 Human Ecology: Biological Aspects
ANTH 4170 Primate Evolutionary Biology

MCD Biology

MCDB 1150/1151 Intro to Molecular Biology 1 and lab (can substitute for EBIO 2060 or EBIO 1210/1230, but cannot apply both to EBIO major)
MCDB 2150 Principles of Genetics (can substitute for EBIO 2070 or 3200, but cannot apply both to EBIO major)
MCDB 2151 Principles of Genetics lab
MCDB 3120 Cell Biology
MCDB 3140 Cell Biology Laboratory
MCDB 3150 Biology of the Cancer Cell
MCDB 3500 Molecular Biology
MCDB 4140 Plant Molecular Biology and Biotechnology
MCDB 4410 Human Molecular Genetics
MCDB 4471 Regulation of Gene Expression in Development
MCDB 4680 Mechanisms of Aging
MCDB 4720 Membrane

Chemistry

CHEM 4191 Chemistry and Biochemistry of the Biosphere
CHEM 4411/4431 Physical Chemistry with Biochemistry Applications 1 and 2
CHEM 4761 Biochemistry Laboratory
CHEM 4711/4731 General Biochemistry 1 and 2

Geography

GEOG 3351 Biogeography
GEOG 4371 Forest Geography

Geology

GEOL 3410 Paleobiology
GEOL 4470 Paleontology of the Lower Vertebrates
GEOL 4480 Paleontology of the Higher Vertebrates

Kinesiology

KAPH 3420 Nutrition, Health and Performance

Museum

MUSM 4011 Introduction to Museum Studies
MUSM 4913 Museum Practicum in Botany
MUSM 4915 Museum Practicum in Zoology
MUSM 4916 Museum in Entomology

Philosophy

PHIL 3140 Environmental Ethics

Psychology

PSYC 3102 Behavioral Genetics
PSYC 4052 Behavioral Neuroscience
PSYC 4092 Hormones and Behavior
PSYC 4112 Behavioral Genetics Laboratory
PSYC 4132 Neuropharmacology
PSYC 4385 Ethology and Comparative Psychology