ECOLOGY AND EVOLUTIONARY BIOLOGY

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The Department of Ecology and Evolutionary Biology (EEB) offers broad education in the biological sciences, covering subject matter that ranges from molecules, cells, and organs through organisms to communities and ecosystems, and the evolutionary processes that shape them. The department offers a B.S. and a B.A. degree. The B.S. program is designed for students planning to pursue graduate study in ecology and evolutionary biology, other biological disciplines, environmental science, or to attend medical, dental, or veterinary school. The B.A. program is intended for students who are interested in ecology, evolution, and organismal diversity as part of a liberal education but do not intend to pursue graduate work in the discipline, or for students who are interested in a second major. The two programs share the same prerequisites, introductory courses, and core requirements but differ in their electives and senior requirements.

COURSES FOR NONMAJORS

Several EEB courses have no college-level prerequisites and are suitable for nonmajors. These include all 1000-level offerings as well as 2000-level courses that deal with particular organism groups such as plants, fish, mammals, birds, and insects or other invertebrates.

CONCENTRATIONS

Students majoring in EEB select one of two concentrations. The concentration in *Biodiversity and the Environment* emphasizes courses appropriate for careers in ecology, evolutionary biology, and environmental science. The concentration in *Organismal Biology* is appropriate for premedical, predental, and preveterinary students, and for students interested in research in physiology, functional morphology, and anatomy. The EEB major offers opportunities for independent research in both laboratory and field.

PREREQUISITES

The prerequisites for the major are intended to provide core scientific literacy; they include courses in biology, chemistry, physics, and mathematics. Finishing these introductory courses early allows for a more flexible program in later years, but it is not necessary to complete them before declaring the major.

The introductory biology sequence BIOL 1010-1040 is required. Also required are a two-term lecture sequence in general chemistry, CHEM 1610, 1650, or CHEM 1630, 1670, with associated laboratories, CHEM 1340L and 1360L; one term of mathematics (MATH 1150 or 1160 or 1200) or one term of statistics & data science (S&DS 1000—1060 or 2300).

Students should take four or five additional courses, for a total of four credits, from among the following options: MATH 1150 or 1160, MATH 1180 or 1200, MATH 2220 or 2250, MATH 2350, 2410, 2420, 2440, 2460, 2470, 2550,

S&DS 1000—S&DS 1060, 2200, 2300, 2380, 2400, CPSC 1001, 1230, 2010, CHEM 1740 or 2200, CHEM 1750 or 2210, CHEM 2220L, 2230L, PHYS 1700 or 1800, PHYS 1710 or 1810, EPS 1100, 2120, 2200, 2220, 2320, 2400, and 2550. No more than two of these four additional courses may originate in the same department.

An online program, ONEXYS for Physics, will be offered in the summer by the Mathematics and Physics departments and by the Poorvu Center for Teaching and Learning, to review math skills needed in preparation for introductory physics courses.

Acceleration credit awarded in chemistry, mathematics, and physics, or completion of advanced courses in those departments, may be accepted in place of the corresponding prerequisites for the EEB major. Students who have mathematics preparation equivalent to MATH 1150 or higher are encouraged to take a statistics course and/or additional mathematics or statistics courses such as MATH 1200, 1210, MATH 2220 or 2250 or 2260, and S&DS 2200 or 2300. Students are strongly urged to take general chemistry in the first or second year. Students who place out of general chemistry can take organic chemistry during their first year.

PLACEMENT PROCEDURES

Students can place out of the introductory biology sequence (BIOL 1010, 1020, 1030, 1040) by means of the biology placement examination administered jointly by the biological science departments, EEB, MB&B, and MCDB, at the beginning of the first year.

Potential EEB majors are expected to take the mathematics placement test. Those who place above the level of MATH 1120 may proceed to introductory courses for the EEB major; those who place into MATH 1120 must take that course first.

For information on placement exams, visit https://yalecollege.yale.edu/first-year-and-new-student-resources/placement-exams-and-information. The Chemistry department arranges placement in chemistry courses.

REQUIREMENTS OF THE MAJOR

See Links to the attributes indicating courses approved for the Ecology and Evolutionary Biology major requirements.

B.S. degree program Beyond the prerequisites, the B.S. degree requires three lecture courses and one laboratory, for three and one-half course credits; two electives for two course credits, one of which must be a lecture or a seminar; and the senior requirement. The required courses in the *Biodiversity and the Environment* concentration are EEB 2220, 2225, and a lecture course on organismal diversity usually chosen from EEB 2246–2272, along with its associated laboratory, or EEB 3326 and EEB 3327L. Other lecture courses on organismal diversity, with laboratory, are permitted with approval of the director of undergraduate studies (DUS), including MCDB 2900 and 2910L. Required courses in the *Organismal Biology* concentration include EEB 2290; EEB 2295 or BENG 3200; MCDB 3000 or MB&B 3000; and EEB 2291L. Most EEB, MCDB, or MB&B courses numbered 2000 or above qualify as electives, as do most research courses and laboratories in a biological sciences department or in the Yale School of Medicine. Courses from other science departments as well as Mathematics, Statistics and Data Science, and Computer Science may qualify with permission of the

DUS. Residential College Seminars may not be counted toward the requirements of the major.

B.A. degree program Beyond the prerequisites, the B.A. degree requires the same courses as the B.S. degree, except for the two electives, for a total of three and one-half course credits (not counting the senior requirement).

Limit on research courses While independent research courses may be taken multiple times for credit, there are restrictions on the number of such courses that can be included in a student's curriculum. See Academic Regulations, section C, Course Credits and Course Loads. Interested sophomores and juniors can take EEB 4469 and EEB 4474. For information on how to become involved in research, see the EEB Guide to Research and Undergraduate Research Opportunities. For information on fellowships and summer experiences, see the EEB Guide to Fellowships and Summer Experiences.

Limit on courses taken in the professional schools Undergraduates may apply up to 4 courses taken in the professional schools for credit towards graduation. See Academic Regulations, section L, Special Academic Arrangements for more information.

Graduate courses of interest to undergraduates Graduate courses in the biological and biomedical sciences that may be of interest to undergraduates are listed in the Graduate School online bulletin, and many are posted on the Biological and Biomedical Sciences website. There is no limit on the number of courses students may take in the Graduate School of Arts and Sciences. Additional information is available from the DUS and the director of graduate studies (DGS). Undergraduates with an appropriate background may enroll with the permission of the DGS and the instructor.

Credit/D/Fail No course, including prerequisites, taken Credit/D/Fail may be applied toward the requirements of the major.

Outside credit Courses taken at another institution or during an approved summer or term-time study abroad program may count toward the major requirements with DUS approval.

SENIOR REQUIREMENT

B.S. degree program Students in the B.S. degree program fulfill the senior requirement by completing two terms of original research in EEB 4475 and EEB 4476, or in EEB 4495 and EEB 4496. Students interested in conducting research before their senior year may do so by taking EEB 4469 or EEB 4474, but they do not count toward the senior requirement.

B.A. degree program Students in the B.A. degree program fulfill the senior requirement either by completing one term of independent study in EEB 4470 or by writing a senior essay. The senior essay may be related to the subject matter of a course, but the senior essay is a separate departmental requirement in addition to any work done in a course and does not count toward the grade in any course. Students intending to write a senior essay must obtain an approval form from the office of the DUS and have it signed by the senior essay adviser before the end of the course selection period. Senior essays must be submitted to the DUS by the last day of classes.

ADVISING

First-year students considering a major in Ecology and Evolutionary Biology are invited to consult with the DUS. After the first year, students should choose an adviser from the department faculty who has interests comparable to their own and/or is a fellow of their residential college. For additional information, visit the EEB website. Students in EEB should consult one of the advisers assigned to their class (see below). The course schedules of all EEB majors (including sophomores intending to major in EEB) must be reviewed by a faculty member in EEB; the signature of the DUS is not required, but is valid for any student. Students whose regular adviser is on leave can consult the DUS to arrange for an alternate.

PEER MENTORS

Peer mentors provide a helpful student perspective to navigating the major and the department. Students are encouraged to contact them.

YEEBUG is an undergraduate group of Yale's Ecology and Evolutionary Biology majors. The student members organize social events and panels, lead field trips, and represent the group at bazaars and academic fairs.

STUDY ABROAD

Participation in study abroad field programs is encouraged. The Organization for Tropical Studies (OTS) and the School for Field Studies (SFS) provide specific opportunities for study of tropical and conservation biology. Credit for such programs may apply toward the major; interested students should consult the DUS prior to going abroad.

SUMMARY OF MAJOR REQUIREMENTS

Prerequisites 13 or 14 courses for 10 credits, as specified
Number of courses *B.S.*—5½ course credits beyond prereqs (not incl senior req); *B.A.*—3½ course credits beyond prereqs (not incl senior req)
Specific courses required For both the *B.A.* and the *B.S.* degrees in *Biodiversity and the Environment*—EEB 2220, EEB 2225; in *Organismal Biology*—EEB 2290; EEB 2295 or BENG 3200; MCDB 3000 or MB&B 3000; and EEB 2291L
Distribution of courses For both the *B.A.* and the *B.S.* degrees in *Biodiversity and the Environment*—1 lecture course from EEB 2246–2272 with associated lab, or EEB 3326 and EEB 3327L; Additionally for the *B.S.*—2 electives as specified
Substitutions permitted MCDB lecture/lab courses on organismal diversity for EEB lecture/lab
Senior requirement *B.S.*—two terms of EEB 4475 and EEB 4476, or EEB 4495 and EEB 4496; *B.A.*—EEB 4470 or senior essay

CONCENTRATIONS

Students majoring in EEB select one of two concentrations.

The concentration in *Biodiversity and the Environment* emphasizes courses appropriate for careers in ecology, evolutionary biology, and environmental science.

Required courses:

- EEB 2220
- EEB 2225

- a lecture course on organismal diversity usually chosen from EEB 2246–2272, along with its associated laboratory, or EEB 3326 and EEB 3327L

The concentration in *Organismal Biology* is appropriate for premedical, predental, and preveterinary students, and for students interested in research in physiology, functional morphology, and anatomy. The EEB major offers opportunities for independent research in both laboratory and field.

Required courses:

- EEB 2290
- EEB 2295 or BENG 3200
- MCDB 3000 or MB&B 3000
- EEB 2291L

FACULTY OF THE DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY

Professors †Richard Bribiescas, †Nicholas Christakis, Michael Donoghue, Casey Dunn, Erika Edwards, †Vivian Irish, Walter Jetz, Thomas Near (*Chair*), David Post, Jeffrey Powell, Richard Prum, †Eric Sargis, †Oswald Schmitz, †David Skelly, Stephen Stearns, †Jeffrey Townsend, Paul Turner, †J. Rimas Vaišnys, Günter Wagner

Associate Professors †Craig Brodersen, †Liza Comita, †Forrest Crawford, †James Noonan, Carla Starver, †Alison Sweeney, David Vasseur

Assistant Professors Martha Munoz, Alvaro Sanchez

Senior Lecturer Marta Martínez Wells

Lecturers Adalgisa Caccone, Linda Puth

†A joint appointment with primary affiliation in another department or school.