The Department of Ecology, Evolution & Environmental Biology (E3B) at Columbia University was established in 2001. Although we are a relatively new department, we have grown rapidly in the past decade. We now have an internationally diverse student body and a broad network of supporters at Columbia and throughout New York City. Our affiliated faculty members come from departments at Columbia as well as from the American Museum of Natural History, the New York Botanical Garden, the Wildlife Conservation Society, and the EcoHealth Alliance. Together, we provide an unparalleled breadth and depth of research opportunities for our students.

In creating E3B, Columbia University recognized that the fields of ecology, evolutionary biology, and environmental biology constitute a distinct subdivision of the biological sciences with its own set of intellectual foci, theoretical foundations, scales of analysis, and methodologies.

E3B’s mission is to educate a new generation of scientists and practitioners in the theory and methods of ecology, evolution, and environmental biology. Our educational programs emphasize a multi-disciplinary perspective to understand life on Earth from the level of organisms to global processes that sustain humanity and all life.

To achieve this multi-disciplinary perspective, the department maintains close ties to over 70 faculty members beyond its central core. Thus, many faculty members who teach, advise, and train students in research are based in other departments on the Columbia campus or at the partner institutions. Through this collaboration, the department is able to tap into a broad array of scientific and intellectual resources in the greater New York City area. The academic staff covers the areas of plant and animal systematics; evolutionary and population genetics; ecosystem science; demography and population biology; behavioral and community ecology; and related fields of epidemiology, ethnobiology, public health, and environmental policy. Harnessing the expertise of this diverse faculty and the institutions of which they are a part, E3B covers a vast area of inquiry into the evolutionary, genetic, and ecological relationships among all living things.

Facilities and Collaborative Institutions

The Department of Ecology, Evolution, and Environmental Biology (E3B)

In addition to the off-campus facilities detailed below, the Columbia community offers academic excellence in a range of natural and social science disciplines that are directly related to biodiversity conservation including: evolution, systematics, genetics, behavioral ecology, public health, business, economics, political science, anthropology, and public and international policy. These disciplines are embodied in world-class departments, schools, and facilities at Columbia. The divisions that bring their resources to bear on issues most relevant to E3B’s mission are: the Lamont-Doherty Earth Observatory, the School of International and Public Affairs, the Goddard Institute for Space Studies, the International Research Institute for Climate Predication, the Black Rock Forest Reserve in New York State, the Rosenthal Center for Alternative/Complementary Medicine, the Division of Environmental Health Sciences at the School of Public Health, and the Center for International Earth Science Information Network (CIESIN). Several of these units of the University are networked through the Earth Institute at Columbia, a division of the University that acts as an intramural network of environmental programs and supplies logistical support for constituent programs, through planning, research, seminars, and conferences. All of the above schools, centers, and institutes contribute to finding solutions for the world’s environmental challenges.

The Earth Institute Center for Environmental Sustainability (EICES)

The Earth Institute Center for Environmental Sustainability (EICES), formerly known as the Center for Environmental Research and Conservation (CERC), is actively involved in protecting biodiversity and ecosystems. The Earth Institute Center for Environmental Sustainability is dedicated to the development of a rich, robust, and vibrant world within which we can secure a sustainable future. Through a diverse array of strategic partners in science, education, and outreach, the center builds unique programs that promote human well-being through the preservation, restoration, and management of biodiversity, and the services our ecosystems provide.

The Center for Environmental Research and Conservation (CERC), a leading provider of cutting-edge environmental research, education, and training, since its inception in 1994, has grown into two institutions—an Earth institute center and a Secretariat for a major environmental consortium. The center’s new name is the Earth Institute Center for Environmental Sustainability (EICES, pronounced “i-sees”). EICES also continues, however, as the Secretariat for the Consortium for Environmental Research and Conservation, continuing 15 years of collaborations between the Earth Institute, the American Museum of Natural History, the New York Botanical Garden, The Wildlife Conservation Society, and EcoHealth Alliance on biodiversity conservation.

American Museum of Natural History

The American Museum of Natural History is one of the world’s preeminent scientific, educational, and cultural institutions. Since its founding in 1869, the Museum has advanced its global mission to discover, interpret, and disseminate information about human cultures, the natural world, and the universe through a wide-reaching program of scientific research, education, and exhibitions. The institution comprises 45 permanent exhibition halls, state-of-the-art research laboratories, one of the largest natural history libraries in the Western Hemisphere, and a permanent collection of 32 million specimens and cultural artifacts. With a scientific staff of more than 200, the Museum supports research divisions in anthropology, paleontology, invertebrate and vertebrate zoology, and the physical sciences. The Museum’s scientific staff pursues a broad agenda of advanced scientific research, investigating the origins and evolution of life on Earth, the world’s myriad species, the rich variety of human culture, and the complex processes that have formed and continue to shape planet Earth and the universe beyond.

The Museum’s Center for Biodiversity and Conservation (CBC) was created in June 1993 to advance the use of scientific data to mitigate threats to biodiversity. CBC programs integrate research, education, and
outreach so that people, a key force in the rapid loss of biodiversity, will become participants in its conservation. The CBC works with partners throughout the world to build professional and institutional capacities for biodiversity conservation and heightens public understanding and stewardship of biodiversity. CBC projects are under way in the Bahamas, Bolivia, Madagascar, Mexico, Vietnam, and the Metropolitan New York region.

The Museum’s scientific facilities include: two molecular systematics laboratories equipped with modern high-throughput technology; the interdepartmental laboratories, which include a state-of-the-art imaging facility that provides analytical microscopy, energy dispersive spectrometry, science visualization, and image analysis to support the Museum’s scientific activities; a powerful parallel-computing facility, including a cluster of the world’s fastest computers, positioned to make significant contributions to bioinformatics; and a frozen tissue facility with the capacity to store one million DNA samples.

New York Botanical Garden
The New York Botanical Garden (NYBG), with its 7 million specimen herbarium, the largest in the Western Hemisphere, and its LuEsther T. Mertz Library, the largest botanical and horticultural reference collection on a single site in the Americas, comprises one of the very best locations in the world to study plant science. NYBG’s systematic botanists discover, decipher, and describe the world’s plant and fungal diversity; and its economic botanists study the varied links between plants and people. The Enid A. Haupt Conservatory, the largest Victorian glasshouse in the United States, features some 6,000 species in a newly installed “Plants of the World” exhibit. The new International Plant Science Center stores the Garden collection under state-of-the-art environmental conditions and has nine study rooms for visiting scholars. All specimens are available for on-site study or loan.

In recent years, NYBG has endeavored to grow and expand its research efforts, supporting international field projects in some two dozen different countries, ranging from Brazil to Indonesia. In 1994, AMNH and NYBG established the Lewis and Dorothy Cullman Program for Molecular Systematics Studies to promote the use of molecular techniques in phylogenetic studies of plant groups. This program offers many opportunities for research in conservation genetics. NYBG operates both the Institute for Economic Botany (IEB) and the Institute of Systematic Botany (ISB). The ISB builds on the Garden’s long tradition of intensive and distinguished research in systematic botany—the study of the kinds and diversity of plants and their relationships—to develop the knowledge and means for responding effectively to the biodiversity crisis.

The Garden has also established a molecular and anatomical laboratory program, which includes light and electron microscopes, and has made enormous advances in digitizing its collection. There is currently a searchable on-line library catalog and specimen database collection with some half million unique records. Field sites around the world provide numerous opportunities for work in important ecosystems of unique biodiversity.

Wildlife Conservation Society
The Wildlife Conservation Society (WCS), founded in 1895 as the New York Zoological Society, works to save wildlife and wild lands throughout the world. In addition to supporting the nation’s largest system of zoological facilities—the Bronx Zoo; the New York Aquarium; the Wildlife Centers in Central Park, Prospect Park, and Flushing Meadow Park; and the Wildlife Survival Center on St. Catherine’s Island, Georgia—WCS maintains a commitment to field-based conservation science.

With 60 staff scientists and more than 100 research fellows, WCS has the largest professional field staff of any U.S.-based international conservation organization. Currently, WCS conducts nearly 300 field projects throughout the Americas, Asia, and Africa. The field program is supported by a staff of conservation scientists based in New York who also conduct their own research.

WCS’s field-based programs complement the organization’s expertise in veterinary medicine, captive breeding, animal care, genetics, and landscape ecology, most of which are based at the Bronx Zoo headquarters. WCS’s Conservation Genetics program places an emphasis on a rigorous, logical foundation for the scientific paradigms used in conservation biology and is linked to a joint Conservation Genetics program with the American Museum of Natural History. The Wildlife Health Sciences division is responsible for the health care of more than 17,000 wild animals in the five New York parks and wildlife centers. The departments of Clinical Care, Pathology, Nutrition, and Field Veterinary Programs provide the highest quality of care to wildlife.

EcoHealth Alliance
EcoHealth Alliance is an international organization of scientists dedicated to the conservation of biodiversity. For more than 40 years, EcoHealth Alliance has focused its efforts on conservation. Today, they are known for innovative research on the intricate relationships between wildlife, ecosystems, and human health.

EcoHealth Alliance’s work spans the U.S. and more than 20 countries in Central and South America, the Caribbean, Africa, and Asia to research ways for people and wildlife to share bioscapes for their mutual survival. Their strength is built on innovations in research, education, and training and accessibility to international conservation partners.

Internationally, EHA programs support conservationists in over a dozen countries at the local level to save endangered species and their habitats, and to protect delicate ecosystems for the benefit of wildlife and humans.

Academic Programs
The Department of Ecology, Evolution, and Environmental Biology runs two undergraduate majors/concentrations. The primary major is in environmental biology and the second is evolutionary biology of the human species. The foci and requirements vary substantially and are intended for students with different academic interests.

The environmental biology major emphasizes those areas of biology and other disciplines essential for students who intend to pursue careers in the conservation of Earth’s living resources. It is designed to prepare students for graduate study in ecology and evolutionary biology, conservation biology, environmental policy and related areas, or for direct entry into conservation-related or science teaching careers.

Interdisciplinary knowledge is paramount to solving environmental biology issues, and a wide breadth of courses is thus essential, as is exposure to current work. Conservation internships are available through partner institutions and serve as research experience leading to the development of the required senior thesis.

Declaration of the environmental biology major must be approved by the director of undergraduate studies and filed in the departmental office located on the 10th floor of Schermerhorn Extension.

The major in evolutionary biology of the human species provides students with a foundation in the interrelated spheres of behavior, ecology, genetics, evolution, morphology, patterns of growth, adaptation,
and forensics. Using the framework of evolution and with attention to the interplay between biology and culture, research in these areas is applied to our own species and to our closest relatives to understand who we are and where we came from. This integrated biological study is also known as biological anthropology. As an interdisciplinary major, students are also encouraged to draw on courses in related fields including biology, anthropology, geology, and psychology as part of their studies.

**Professors**
Marina Cords (also Anthropology)
Ruth DeFries (also Climate School)
Maria Diuk-Wasser
Kevin Griffin (also Earth and Environmental Sciences)
Shahid Naem
Dustin Rubenstein
Maria Uriarte

**Associate Professors**
Duncan Menge

**Assistant Professors**
Andrés Bendesky
Deren Eaton

**Lecturers**
Bekka Brodie
Matthew Palmer
Jill Shapiro

**Adjunct Faculty/Research Scientists**
*Columbia University*
Hilary Callahan (Barnard Biology)
Steven Cohen (SIPA)
Lisa Dale
Adela Gondek (SIPA)
Paul Hertz (Barnard)
Darcy Kelley (Biology)
Allison Lopatkin (Barnard Biology)
Alba Morales-Jimenez
Brian Morton (Barnard Biology)
Paul Olsen (Lamont-Doherty)
Dorothy Peteet (Lamont-Doherty)
Miguel Pinedo Vasquez
Alison Pischedda (Barnard Biology)
Robert Pollack
Marya Pollack
Paige West (Barnard)
Natalie Boelman (Lamont-Doherty)

**American Museum of Natural History**
Felicity Arengo
Mary Blair
Frank Burbrink
Joel Cracraft
Suzanne Macey
Anna MacPherson
Christopher Raxworthy
Robert Rockwell
Nancy Simmons

Brian Smith
Jessica Ware

**The New York Botanical Garden**
Alex McAlvay
Michael Balick
Dennis Stevenson

**Wildlife Conservation Society**
Howard Rosenbaum
Scott Silver
Patrick R. Thomas

**Ecohealth Alliance**
Peter Daszak
Kevin Olival
Mindy Rostal

**Others**
Rachel Cox (Riverdale Country School)
Winslow Hansen (Cary Institute)
Sara Kross (University of Canterbury)
Chad Seewagen (Great Hollow)
Eleanor Sterling (Hawai‘i Institute of Marine Biology)

**Guidelines for all Ecology, Evolution, and Environmental Biology Majors and Concentrators**
The grade of D is not accepted for any course offered in fulfillment of the requirements toward the majors or concentrations.

---

**Major in Environmental Biology**
The major in environmental biology requires 50 points, distributed as follows:

**Lower Division Courses**
Two terms of introductory or environmental biology such as the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEEB UN2001</td>
<td>ENVIRONMENTAL BIOLOGY I</td>
</tr>
<tr>
<td>EEEB UN2002</td>
<td>and ENVIRONMENTAL BIOLOGY II</td>
</tr>
</tbody>
</table>

Two terms of environmental science such as the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EESC UN2100</td>
<td>EARTHY’S ENVIRO SYST: CLIM SYST</td>
</tr>
<tr>
<td>EESC UN2200</td>
<td>EARTHY’S ENVIRONMENTAL SYSTEMS: THE SOLID EARTH</td>
</tr>
</tbody>
</table>

Two terms of chemistry such as the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM UN1403</td>
<td>GENERAL CHEMISTRY I-LECTURES</td>
</tr>
<tr>
<td>CHEM UN1404</td>
<td>and GENERAL CHEMISTRY II-LECTURES</td>
</tr>
</tbody>
</table>

One term of physics such as the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS UN1201</td>
<td>GENERAL PHYSICS I</td>
</tr>
</tbody>
</table>

One term of statistics such as the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEEB UN3005</td>
<td>INTRO-STAT-ECOLOGY # EVOL BIOL</td>
</tr>
<tr>
<td>BIOL BC2286</td>
<td>Statistics and Research Design</td>
</tr>
<tr>
<td>STAT UN1101</td>
<td>INTRODUCTION TO STATISTICS</td>
</tr>
</tbody>
</table>
Evolutionary Biology of the Human Species

Upper Division Courses

Students must complete five advanced elective courses (generally 3000-level or above) satisfying the following distribution. At least one of these courses must include a laboratory component. For more information and a list of appropriate courses, contact the director of undergraduate studies.

1. Three courses in ecology, evolution, conservation biology, or behavior;
2. One course in genetics. BIOL UN3031 GENETICS or BIOL BC2100 MOLECULAR # MENDELIAN GENETICS is recommended;
3. One course in morphology, physiology, or diversity.

Students must also complete a senior thesis, which involves completing a research internship (generally in the summer before the senior year) and completing at least one semester of the thesis research seminar, EEEB UN3991-EEEB UN3992 THESIS RESEARCH SEMINAR. Enrollment in both semesters of the seminar, starting in the spring of the junior year, is recommended.

Students planning on continuing into graduate studies in ecology or evolutionary biology are encouraged to take organic chemistry.

Major in Evolutionary Biology of the Human Species

The major in evolutionary biology of the human species requires 36 points, distributed as described below.

Students must take a minimum of 20 points from approved biological anthropology courses. The additional courses may be taken in other departments with adviser approval. These include up to 6 points of introductory biology/chemistry or calculus (in any combination). Please speak with the major adviser about the extended list of courses from related areas including Biology, Psychology, Archaeology, Anthropology, Earth and Environmental Science, and Statistics that count toward this program.

For example, students interested in focusing on paleoanthropology would complement the requirements with additional courses in human evolution and morphology, evolutionary biology and theory, archaeology, genetics, and statistics. Those interested in primate behavior would supplement the requirements with classes in behavioral biology, ecology, and statistics.

Required Courses

EEEB UN1010 HUMAN ORIGINS # EVOLUTION
EEEB UN1011 BEHAVIOR BIOL-LIVING PRIMATES

Ecology and Evolution Track within the Environmental Biology Major

The ecology and evolution track within the environmental biology major requires 50 points, distributed as follows:

Lower Division Courses

Two terms of introductory or environmental biology such as the following:
EEEB UN2001 ENVIRONMENTAL BIOLOGY I
- EEEB UN2002 ENVIRONMENTAL BIOLOGY II
Two terms of chemistry such as the following:
CHEM UN1403 GENERAL CHEMISTRY I-LECTURES
- CHEM UN1404 GENERAL CHEMISTRY II-LECTURES
Chemistry laboratory such as the following:
CHEM UN1500 GENERAL CHEMISTRY LABORATORY
Two terms of physics such as the following:
PHYS UN1201 GENERAL PHYSICS I
- PHYS UN1202 GENERAL PHYSICS II
One term of statistics such as the following:
EEEB UN3005 INTRO-STAT-ECOLOGY # EVOL BIOL
BIOL BC2286 Statistics and Research Design
STAT UN1101 INTRODUCTION TO STATISTICS
STAT UN1201 CALC-BASED INTRO TO STATISTICS
Two terms of calculus, or one term of calculus and second advanced course in math or statistics such as the following:
MATH UN1101 CALCULUS I
**Alternate options may be possible for all courses other than EEEB UN1010 HUMAN ORIGINS # EVOLUTION and EEEB UN1011 BEHAVIOR BIOL-LIVING PRIMATES. These will be considered on an individual basis in consultation with the major/concentration adviser.**

**Conservation Course**

EEEB UN3240  Challenges and Strategies of Primate Conservation (This is the recommended conservation course but this requirement can be fulfilled with other classes such as Conservation Biology, Zoo Conservation, Ecology, Behavior and Conservation of Mammals, SEE-U in Jordan or Brazil, or other relevant offerings.)

**Theoretical Foundation from Archaeology**

Select one course of the following: Nearly all archaeology courses (save for Rise of Civilization) can fulfill this requirement. Check with the advisor.

**Archaeology**

ANTH UN1007  THE ORIGINS OF HUMAN SOCIETY
ANTH UN2028  THINK LIKE AN ARCHAEOLOGIST
ANTH UN3064  Death and the Body
ANTH UN3823  ARCH ENGAGE: PAST IN PUB EYE

**Breadth Requirement**

Select a minimum of one course from each of the three sections (may overlap seminar requirement for majors):

**Genetics/Human Variation**

BIOL BC2100  MOLECULAR # MENDELIAN GENETICS
BIOL UN3031  GENETICS
BIOL GU4560  EVOL IN THE AGE OF GENOMICS
ANTH UN3970  BIOSIS BASIS OF HUMAN VARIATION
EEEB GU4340  HUMAN ADAPTATION
EEEB GU4700  RACE: TANGLED HIST-BIOI CONCEPT

**Primate Behavioral Biology and Ecology**

EEEB UN3940  Current Controversies in Primate Behavior and Ecology
BIOL BC2272  ECOLOGY
BIOL BC2280  ANIMAL BEHAVIOR
PSYC UN2420  ANIMAL BEHAVIOR
PSYC BC1119  Systems and Behavioral Neuroscience
PSYC UN2450  BEHAVIORAL NEUROSCIENCE
PSYC BC3372  Comparative Cognition
PSYC UN3450  Evolution of Intelligence, Animal Communication, # Language
PSYC UN3460  Evolution of Behavior (Seminar)
PSYC UN3470  Brain Evolution: Becoming Human (Seminar)
EEEB GU4010  The Evolutionary Basis of Human Behavior
EEEB GU4134  Behavioral Ecology
EEEB GU4201  ECO, BEHAVIOR # CONSERVATION OF MAMMALS (can count for either breadth requirement or conservation requirement, but not both)

**Human Evolution/Morphology**

EEEB UN3208  EXPLORATIONS IN PRIM ANATOMY
EEEB UN3215  FORENSIC OSTEOLOGY

EEEB UN3220  THE EVOL OF HUM GROWTH # DEVPT
ANTH GU4147  Human Skeletal Biology I
ANTH GU4148  HUMAN SKELETAL BIOLOGY II
EEEB UN3204  Dynamics of Human Evolution
EEEB UN3910  THE NEANDERTALS
ANTH GU4002  Controversial Topics in Human Evolution
BIOL BC2278  Evolution
BIOL UN3208  Introduction to Evolutionary Biology
EEEB UN3030  The Biology, Systematics, and Evolutionary History of 'The Apes'
BIOL BC2262  Vertebrate Biology
BIOL UN3006  PHYSIOLOGY
BIOL BC3360  PHYSIOLOGY
EEEB GU4200  Introduction to Mammalogy

**Seminar**

Selection at least one of the following seminars. May also count toward the breadth requirement.

EEEB UN3204  Dynamics of Human Evolution
EEEB UN3910  THE NEANDERTALS
EEEB UN3940  Current Controversies in Primate Behavior and Ecology
ANTH UN3970  BIOL BASIS OF HUMAN VARIATION
EEEB UN3993 - EEEB UN3994  EBHS SENIOR THESIS SEMINAR
EEEB GU4321  HUM NATURE: DNA, RACE & IDENTITY
ANTH GU4002  Controversial Topics in Human Evolution (Fulfills the seminar requirement for the major)

Additional courses in the student’s area of focus to complete the required 36 points overall including a minimum of 20 points of approved biological anthropology courses.

Students intending to pursue graduate study in this field should broaden their foundation by taking an introductory biology course (optimally either EEEB UN2001 ENVIRONMENTAL BIOLOGY I or EEEB UN2002 ENVIRONMENTAL BIOLOGY II) or an advanced evolution course, a genetics course, and a statistics course. We recommend that those interested in either biological anthropology or bioarchaeology take a foundation cultural anthropology course such as ANTH UN1002 THE INTERPRETATION OF CULTURE, ANTH UN2004 INTRO TO SOC # CULTURAL THEORY, ANTH UN2005 THE ETHNOGRAPHIC IMAGINATION, or ANTH UN3040 ANTHROPOLOGICAL THEORY. Students interested in forensic anthropology should take chemistry in lieu of biology (though the latter is recommended as a foundation course for all students). The adviser makes additional recommendations dependent on the student’s area of focus.

**Approved Biological Anthropology Courses**

**Paleoanthropology and Morphology**

EEEB UN1010  HUMAN ORIGINS # EVOLUTION
EEEB UN3204  Dynamics of Human Evolution
EEEB UN3208  EXPLORATIONS IN PRIM ANATOMY
EEEB UN3215  FORENSIC OSTEOLOGY
EEEB UN3220  THE EVOL OF HUM GROWTH # DEVPT
EEEB UN3910  THE NEANDERTALS
### Concentration in Evolutionary Biology of the Human Species

The concentration in evolutionary biology of the human species requires 20 points including the required introductory courses EEEB UN1010 HUMAN ORIGINS # EVOLUTION, EEEB UN1011 BEHAVIOR BIOL-LIVING PRIMATES, and three courses for the breadth distribution requirements as described for the major. Students must take a minimum of 15 points from approved biological anthropology courses as described for the major (the two introductory classes count toward that total). The additional courses may be taken in other departments with adviser approval.

Concentrators do not have to complete the theoretical foundation course from archaeology or a seminar.

### Special Concentration in Environmental Science for Environmental Biology Majors

The Department of Earth and Environmental Sciences sponsors a special concentration which must be done in conjunction with the environmental biology major. Students should be aware that they must complete the environmental biology major in order to receive credit for the special concentration.

The special concentration in environmental science requires a minimum of 31.5 points, distributed as follows:

#### Introductory Environmental Science (13.5 points)
- EESC UN2100 EARTH'S ENVIRO SYST: CLIM SYST
- EESC UN2200 EARTH'S ENVIRONMENTAL SYSTEMS: THE SOLID EARTH
- EESC UN2300 EARTH'S ENVIRO SYST: LIFE SYST (equivalent to EEB 2002)

#### Introductory Science (6 points)
Two courses in chemistry, physics, mathematics, or environmental biology from the supporting mathematics and science list for the environmental science major.

#### Advanced Environmental Science (12 points)
Select four of the following:
- EESC UN3015 The Earth's Carbon Cycle
- EESC BC3017 ENVIRONMENTAL DATA ANALYSIS
- EESC BC3025 HYDROLOGY
- EESC GU4008 Introduction to Atmospheric Science
- EESC GU4050 GLOBAL ASSMT-REMOTE SENSING
- EESC GU4223 SEDIMENTARY GEOLOGY
- EESC GU4550 Plant Ecophysiology
- EESC GU4835 Wetlands and Climate Change
- EESC GU4885 CHEMISTRY OF CONTINENTL WATERS
- EESC GU4917 THE EARTH/HUMAN INTERACTIONS
- EESC GU4926 INTRO TO CHEMICAL OCEANOGRAPHY

Advanced courses used to fulfill requirements in the environmental biology major cannot count toward requirements for the special concentration.
Special Concentration in Environmental Biology for Environmental Science Majors

The Department of Ecology, Evolution, and Environmental Biology sponsors a special concentration which must be done in conjunction with the environmental science major. Students should be aware that they must complete the environmental science major in order to receive credit for the special concentration.

The special concentration in environmental biology requires a minimum of 39 points, distributed as follows:

**Introductory Environmental Biology and Environmental Science (17 points)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEEB 2001</td>
<td>ENVIRONMENTAL BIOLOGY I</td>
<td>3.00</td>
</tr>
<tr>
<td>EEEB 2002</td>
<td>ENVIRONMENTAL BIOLOGY II (equivalent to EESC UN2300)</td>
<td>3.00</td>
</tr>
<tr>
<td>EESC 2100</td>
<td>EARTH'S ENVIRO SYST: CLIM SYST</td>
<td>3.00</td>
</tr>
<tr>
<td>EESC 2200</td>
<td>EARTH'S ENVIRONMENTAL SYSTEMS: THE SOLID EARTH</td>
<td>3.00</td>
</tr>
</tbody>
</table>

**Introductory Science (13 points)**

Select one of the following chemistry sequences:

- **CHEM 1403** GENERAL CHEMISTRY I-LECTURES
  - **CHEM 1404** and GENERAL CHEMISTRY II-LECTURES
- **CHEM 1604** 2ND TERM GEN CHEM (INTENSIVE)
  - **CHEM 2507** and Intensive General Chemistry Laboratory

One term of statistics such as the following:

- **EEEB 3005** INTRO-STAT-ECOLOGY # EVOL BIOL
- **BIOL BC2286** Statistics and Research Design
- **STAT UN1101** INTRODUCTION TO STATISTICS
- **STAT UN1201** CALC-BASED INTRO TO STATISTICS
- **EEEB 3087** CONSERVATION BIOLOGY

**Advanced Environmental Biology (9 points)**

Three additional advanced environmental biology courses (3000-level and above), each chosen from a different curricular area (evolution/genetics, ecology/behavior/conservation, anatomy/physiology/diversity, biology laboratory courses).

**Fall 2024**

**EEEB UN1110 HUMAN ORIGINS # EVOLUTION. 3.00 points.**

CC/GS: Partial Fulfillment of Science Requirement

Lab fee: $25. Taught every fall.

This is an introductory course in human evolution. Building on a foundation of evolutionary theory, students explore primate behavioral morphology and then trace the last 65 million years of primate evolution from the earliest Paleocene forms to the fossil remains of earliest humans and human relatives. Along with Behavioral Biology of the Living Primates this serves as a core required class for the EBH program.
EEEB UN3991 THESES RESEARCH SEMINAR. 3.00 points.

Open only to seniors.

Guided, independent, indepth research experience culminating in the senior essay. Weekly meetings are held to review work in progress, to share results through oral and written reports, and to consider career options for further work in this field.

Fall 2024: EEEB UN3991
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 3991 001/12068 Th 4:10pm - 6:00pm Room TBA Matthew Palmer 3.00 7/20

EEEB UN3993 EBHS SENIOR THESIS SEMINAR. 3.00 points.

Four points for the year-long course.

Prerequisites: the instructor's permission and senior standing as a major in The Evolutionary Biology of the Human Species (EBHS).

Prerequisites: the instructor's permission and senior standing as a major or concentration in The Evolutionary Biology of the Human Species (EBHS). Year-long seminar in which senior EBHS majors develop a research project and write a senior thesis. Regular meetings are held to discuss research and writing strategies, review work in progress, and share results through oral and written reports.

Fall 2024: EEEB UN3993
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 3993 001/12069 Jill Shapiro 3.00 3/8

EEEB UN3997 INDEPENDENT STUDY. 1.00-3.00 points.

CC/GS: Partial Fulfillment of Science Requirement

Students conduct research in environmental biology under supervision of a faculty mentor. The topic and scope of the research project must be approved before the student registers for the course.

Fall 2024: EEEB UN3997
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 3997 001/12070 Jill Shapiro 1.00-3.00 3/6

EEEB GU4005 Conservation Policy. 3 points.

Prerequisites: Students should have completed at least one course in ecology, evolution or conservation biology.

The purpose of this course is to arm emerging scientists with an understanding of conservation policy at the city, state, federal and international levels. Our focus will be on understanding the science that informs conservation policy, evaluating the efficacy of conservation policies for achieving conservation goals, and learning about the role that scientists play in forming policy.

Fall 2024: EEEB GU4005
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 4005 001/12071 T 10:10am - 12:00pm 1015 Ext Schermerhorn Hall Viorel Popescu 3 20/20

EEEB GU4065 Tropical Biology. 4.00 points.

Study ecology, evolution, and conservation biology in one of the world's most biologically spectacular settings, the wildlife-rich savannas of Kenya. Although we will meet have a few meetings during the fall semester, the majority of the coursework will be completed during a 16 day field trip to Kenya during winter break. Students will spend their time immersed in an intensive field experience gaining sophisticated training in fieldwork and biological research. Note that there is a lab fee to cover all in-country expenses, and students are also responsible for the cost of airfare to and from Kenya.

Fall 2024: EEEB GU4065
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 4065 001/12072 1.00-3.00 Dustin Rubenstein 4.00 11/14

EEEB GU4100 FOREST ECOLOGY. 4.00 points.

Prerequisites: one year of college biology.

EEEB GU4100 Forest Ecology focuses on interpreting and understanding pattern and process in forested ecosystems. These ecosystems include the assemblages of trees and the biological communities and environments in which they exist. The complex interactions among the organisms and the physical environment are a major focus of this course. The course involves lecture, literature discussion, and field laboratory components, with an emphasis on the analysis and interpretation of student-collected data. FRIDAY MEETINGS WILL RUN ALL DAY IN SEPTEMBER AND OCTOBER.

Fall 2024: EEEB GU4100
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 4100 001/12073 W 1:10pm - 2:25pm 1015 Ext Schermerhorn Hall Matthew Palmer, Kevin Griffin 4.00 16/16
EEEB 4100 001/12073 F 9:00am - 1:00pm 1015 Ext Schermerhorn Hall Matthew Palmer, Kevin Griffin 4.00 16/16

EEEB GU4129 Zoo Conservation. 3 points.

CC/GS: Partial Fulfillment of Science Requirement

This course examines the role and function of the modern zoo in the context of the modern conservation movement. Students will learn about the evolution of the zoological park from an entertainment venue to a reservoir of rare or otherwise endangered species of animals, and as a catalyst for conservation of these species.

Fall 2024: EEEB GU4129
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 4129 001/12074 Th 6:10pm - 8:00pm 1015 Ext Schermerhorn Hall Scott Silver 3 12/12

EEEB GU4140 ORNITHOLOGY. 3.00 points.

Prerequisites: EEEB UN2001, EEEB UN2002, or equivalent.

This basic ornithology class lays the foundation for more in-depth study as it presents an overview of avian evolution, ecology, and current conservation issues.

Fall 2024: EEEB GU4140
Course Number Section/Call Times/Location Instructor Points Enrollment
EEEB 4140 001/12075 Th 10:10am - 12:00pm 1015 Ext Schermerhorn Hall Chad Seewagen 3.00 15/15
EEEB GU4196 Coastal Ecosystem Science and Policy. 3.00 points.
With approximately 40% of the global population residing in coastal regions, only about 15% of Earth’s coastlines remain intact. Human interactions have affected these complex and biodiverse ecosystems for thousands of years, leaving coasts vulnerable to climate change and the demands of human population increase. By understanding both the science and social behaviors behind ecosystem dynamics, policies can be put forth to mitigate current anthropogenic influences on coastal integrity. This seminar will take a multi-disciplinary in examining current issues and policies that affect coastal ecosystems around the world. To do so, the semester will be divided into three sections. We will begin with the foundations: what defines a coastal ecosystem and how society and these environments have influenced one another. The second part of class will provide a primer on policy development and implementation. Finally, the remainder of the semester will be dedicated to the pertinent problems facing today’s coastal ecosystems and the policies put forth in response. Bulletin Description: With approximately 40% of the global population residing in coastal regions, only about 15% of Earth’s coastlines remain intact. This course provides an overview of pressing issues and key policies that impact these coastal ecosystems. We will examine the roles that science, history, and social dynamics play in developing and implementing coastal policies and management, while enhancing skills in science communication. Some background in ecology, such as EBLI, is recommended but not required. Previous experience in policy is not required.

EEEB 4350 PRIMATE SEXUALITY. 3.00 points.
CC/GS: Partial Fulfillment of Science Requirement
Prerequisites: (EEEB UN1010) or (EEEB UN1011)
In this course we take an integrative and comparative approach to understanding the sexual lives of primates. Focusing on mating and reproductive behavior with an explicitly evolutionary perspective, we will identify the fundamental principles of how and why selection has favored particular behaviors and morphologies in different primate species.

Spring 2024
EEEB UN1005 1ST YR-ECOL, EVOL, EVIR BIO. 1.00 point.
This course provides a brief introduction to ecology, evolution and environmental biology with an emphasis on key concepts, current research, and opportunities for undergraduates. The course is taught jointly by the faculty in the department of Ecology, Evolution and Environmental Biology (E38), with each session covering a different aspect of research and/or teaching in the department. Students are expected to complete weekly readings and participate in discussion both in class and online.

EEEB UN1011 BEHAVIORAL BIOL-LIVING PRIMATES. 3.00 points.
CC/GS: Partial Fulfillment of Science Requirement
Prerequisites: Corequisite EEB GU1111
Prerequisites: Corequisite EEB UN1111 Study of non-human primate behavior from the perspective of phylogeny, adaptation, physiology and anatomy, and life history. Focuses on the four main problems primates face: finding appropriate food, avoiding being eaten themselves, reproducing in the face of competition, and dealing with social partners. Along with Human Origins - Evolution, this serves as a core required class for the EBHS program.

EEEB UN2002 ENVIRONMENTAL BIOLOGY II. 4.00 points.
CC/GS: Partial Fulfillment of Science Requirement
Prerequisites: EEB 2001
Prerequisites: EEB UN2001 Second semester of introductory biology sequence for majors in environmental biology and environmental science, emphasizing the ecological and evolutionary aspects of biology. Also intended for those interested in an introduction to the principles of ecology and evolutionary biology.
EEEB UN3187 CONSERVATION BIOLOGY-DISC. 0.00 points.
Spring 2024: EEEB UN3187
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3187   001/13385  W 6:10pm - 7:00pm  307 Mathematics Building  Dustin Partridge  0.00  15/15
EEEB 3187   002/13393  Th 6:10pm - 7:00pm  652 Schermerhorn Hall  Dustin Partridge  0.00  15/15

EEEB UN3204 Dynamics of Human Evolution. 4 points.
CC/GS: Partial Fulfillment of Science Requirement
Enrollment limited to 13. Priority is given to EBHS majors/concentrators.
Prerequisites: EEEB UN1010 Human Species/HO&E, ANTH UN1007 Origins of Human Society, or the equivalent.
Seminar focusing on recent advances in the study of human evolution. Topics include changing views of human evolution with respect to early hominin behavior, morphology, culture and evolution. [Either Dynamics of Human Evolution or Neandertals is taught every other year.]

EEEB UN3215 FORENSIC OSTEOLOGY. 3.00 points.
CC/GS: Partial Fulfillment of Science Requirement
Taught every other year. Enrollment limited to 15. Priority given at first class session to EBHS majors/concentrators.
Prerequisites: no prior experience with skeletal anatomy required. Not appropriate for students who have already taken either EEEB GU4147 or EEEB GU4148.
Prerequisites: no prior experience with skeletal anatomy required. Not appropriate for students who have already taken either EEEB GU4147 or EEEB GU4148. An exploration of the hidden clues in your skeleton. Students learn the techniques of aging, sexing, assessing ancestry, and the effects of disease, trauma and culture on human bone

EEEB UN3992 THESIS RESEARCH SEMINAR. 3.00 points.
Guided, independent, indepth research experience culminating in the senior essay. Weekly meetings are held to review work in progress, to share results through oral and written reports, and to consider career options for further work in this field

EEEB UN3994 EBHS SENIOR THESIS SEMINAR. 3.00 points.
Prerequisites: the instructors permission and senior standing as a major in The Evolutionary Biology of the Human Species (EBHS). Year-long seminar in which senior EBHS majors develop a research project and write a senior thesis. Regular meetings are held to discuss research and writing strategies, review work in progress, and share results through oral and written reports

EEEB UN3998 INDEPENDENT STUDY. 1.00-3.00 points.
CC/GS: Partial Fulfillment of Science Requirement
Students conduct research in environmental biology under supervision of a faculty mentor. The topic and scope of the research project must be approved before the student registers for the course

EEEB GU4015 ANIMAL COMMUN:PRIMATE PERSP. 3.00 points.

Spring 2024: EEEB UN3187
EEEB 3187  001/13385  W 6:10pm - 7:00pm  307 Mathematics Building  Dustin Partridge  0.00  15/15

Spring 2024: EEEB UN3204
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3204   001/13293  Th 4:10pm - 6:00pm  652 Schermerhorn Hall  Jill Shapiro  4  11/12

Spring 2024: EEEB UN3215
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3215   001/13304  M W 4:10pm - 6:00pm  506 Schermerhorn Hall  Jill Shapiro  3.00  13/15

Spring 2024: EEEB UN3992
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3992   001/13324  Th 4:10pm - 6:00pm  202 Altshul Hall  Matthew Palmer, Maria Strangas, Darice Westphal  3.00  11/20

Spring 2024: EEEB UN3994
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3994   001/13330  M 1:10pm - 3:00pm  1026 Schermerhorn Hall  Jill Shapiro  3.00  2/6

Spring 2024: EEEB UN3998
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3998   001/13333  T Th 10:10am - 11:25am  328 Uris Hall  Alba Lucia Morales Jimenez  3.00  7/20

Spring 2024: EEEB UN3998
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3998   002/13335  M W 4:10pm - 6:00pm  652 Schermerhorn Hall  Jill Shapiro  4  11/12

Spring 2024: EEEB UN3998
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3998   003/20920  M W 4:10pm - 6:00pm  652 Schermerhorn Hall  Jill Shapiro  4  11/12

Spring 2024: EEEB UN3998
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 3998   004/20969  M W 4:10pm - 6:00pm  652 Schermerhorn Hall  Andres Bendesky  4  11/12

Spring 2024: EEEB GU4015
Course Number  Section/Call Number  Times/Location  Instructor  Points  Enrollment
EEEB 4015   001/13333  T Th 10:10am - 11:25am  328 Uris Hall  Alba Lucia Morales Jimenez  3.00  7/20
EEEB GU4055 Principles and Applications of Modern DNA Sequencing. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: An introductory biology course or instructor permission
Genome sequencing, the technology used to translate DNA into data, is now a fundamental tool in biological and biomedical research, and is expected to revolutionize many related fields and industries in coming years as the technology becomes faster, smaller, and less expensive. Learning to use and interpret genomic information, however, remains challenging for many students, as it requires synthesizing knowledge from a range of disciplines, including genetics, molecular biology, and bioinformatics. Although genomics is of broad interest to many fields, such as ecology, evolutionary biology, genetics, medicine, and computer science, students in these areas often lack sufficient background training to take a genomics course. This course bridges this gap, by teaching skills in modern genomic technologies that will allow students to innovate and effectively apply these tools in novel applications across disciplines. To achieve this, we implement an active learning approach to emphasize genomics as a data science, and use this organizing principle to structure the course around computational exercises, lab-based activities using state-of-the-art sequencing instruments, case studies, and field work. Together, this approach will introduce students to the principles of genomics by allowing them to generate, analyze, and interpret data hands-on while using the most cutting-edge genomic technologies of today in a stimulating and engaging learning experience.

EEEB GU4105 Intermediate Statistics for Ecology and Evolutionary Biology. 3.00 points.
This course builds on an introductory course in statistics and dives deeper into linear regression models, including generalized linear models, mixed/hierarchical models, model diagnostics, and model selection. It focuses on the practical applications of these methods rather than the mathematical complexities. A prior course or equivalent knowledge of fundamental concepts in statistics as well as familiarity with R programming are required pre-requisites for this course

Spring 2024: EEEB GU4105
Course Number   | Section/Call Number | Times/Location           | Instructor         | Points | Enrollment |
---             |                     |                         |                   |        |            |
EEEB 4105      | 001/13349           | T 6:10pm - 8:00pm       | Steffen Foerster  | 3.00   | 8/20       |
               |                     | 305 Uris Hall           |                   |        |            |
EEEB 4105      | 001/13349           | Th 6:10pm - 8:00pm      | Steffen Foerster  | 3.00   | 8/20       |
               |                     | 305 Uris Hall           |                   |        |            |

EEEB GU4112 Ichthyology. 3 points.
CC/GS: Partial Fulfillment of Science Requirement

Fish are an incredibly diverse group with upwards of 27,000 named species. They are important ecologically, represent one of the major vertebrate lineages and face numerous conservation threats. This course will provide students with the tools to understand how the evolution, systematics, anatomy, and diversity of fishes influence their conservation status.

Spring 2024: EEEB GU4112
Course Number   | Section/Call Number | Times/Location           | Instructor         | Points | Enrollment |
---             |                     |                         |                   |        |            |
EEEB 4112      | 001/13352           | F 10:10am - 12:40pm     | Bruno Melo         | 3      | 12/15      |
               |                     | 1015 Ext Schermerhorn Hall |                       |        |            |

EEEB GU4126 INTRO TO CONSERVATION GENETICS. 3.00 points.
In this course, we will use evolutionary genetic principles and population genetic models to describe the extent and distribution of genetic variation in populations and species, and determine ways to conserve it. A basic knowledge of genetics and mathematics is assumed.

Spring 2024: EEEB GU4126
Course Number   | Section/Call Number | Times/Location           | Instructor         | Points | Enrollment |
---             |                     |                         |                   |        |            |
EEEB 4126      | 001/13357           | Th 12:10pm - 2:00pm     | Rachel Welt        | 3.00   | 10/20      |
               |                     | 1015 Ext Schermerhorn Hall |                       |        |            |

EEEB GU4135 URBAN ECOLOGY # DESIGN. 3.00 points.
Spring 2024: EEEB GU4135
Course Number   | Section/Call Number | Times/Location           | Instructor         | Points | Enrollment |
---             |                     |                         |                   |        |            |
EEEB 4135      | 001/13361           | F 11:10am - 1:00pm      | Matthew Palmer     | 3.00   | 29/35      |
               |                     | 608 Schermerhorn Hall   |                   |        |            |

EEEB GU4201 ECO, BEHAVIOR # CONSERVATION OF MAMMALS. 3.00 points.
CC/GS: Partial Fulfillment of Science Requirement

Prerequisites: A course in either organismal biology, evolution, ecology or permission of the instructor if G4200 was not taken. This course examines the wide ranging aspects of features of mammalian natural history, behavior and ecology, and considers the implications of these features on the conservation status of particular mammal taxa for the future. We will also explore particular conservation challenges for mammals such as bats, grazing mammals, and large carnivores in increasingly human-dominated landscapes. This course will be a combination of lecture and student led discussions related to the conservation issues facing mammals today.

Spring 2024: EEEB GU4201
Course Number   | Section/Call Number | Times/Location           | Instructor         | Points | Enrollment |
---             |                     |                         |                   |        |            |
EEEB 4201      | 001/13367           | Th 6:10pm - 8:00pm      | Scott Silver       | 3.00   | 9/12       |
               |                     | 1015 Ext Schermerhorn Hall |                       |        |            |
EEEB GU4650 Biodiversity and Ecosystem Processes. 3 points.
Prerequisites: E3B courses in ecology, evolution and/or biodiversity or the instructor’s permission.
Survey of current advances in scientific research that focuses on the role biodiversity plays in governing ecological processes (e.g., biogeochemistry, resisting invasion by exotic species, or stabilizing communities) and ecosystem services (e.g., soil fertility, water quality, climate regulation).

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Section/Call Number</th>
<th>Times/Location</th>
<th>Instructor</th>
<th>Points</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEEB 4650</td>
<td>001/13371</td>
<td>M 4:10pm - 6:00pm 1015 Ext Schermerhorn Hall</td>
<td>Shahid Naeem</td>
<td>3</td>
<td>9/25</td>
</tr>
</tbody>
</table>

Of Related Interest

**Economics**
ECON GU4625 Economics of the Environment

**Earth and Environmental Sciences**
EESC UN2330 SCIENCE FOR SUSTAINABLE DEVPT
EESC GU4050 GLOBAL ASSMT-REMOTE SENSING
EESC GU4550 Plant Ecophysiology
EESC GU4835 Wetlands and Climate Change

**Political Science**
POLS GU4730 GAME THEORY # POLIT THEORY