Why study Biology?
"Pursuing a career in biology can be immensely rewarding and exciting. Studying biology teaches us to ask questions, make observations, evaluate evidence, and solve problems. Biologists learn how living things work, how they interact with one another, and how they evolve. They may study cells under a microscope, insects in a rainforest, viruses that affect human beings, plants in a greenhouse, or lions in the African grasslands. Their work increases our understanding about the natural world in which we live and helps us address issues of personal well-being and worldwide concern, such as environmental depletion, threats to human health, and maintaining viable and abundant food supplies."

Who should major in Ecology, Evolution, and Biodiversity?
The Ecology, Evolution, and Biodiversity (EEB) major provides a comprehensive foundation in the biological sciences, places an emphasis on undergraduate research experience, and provides an integrated perspective on the origins and complex interactions of the earth's biodiversity and ecosystems. It focuses on numerous levels of biological organization over multiple time scales, including studies of genes and genomes, individual organisms, populations, communities and ecosystems. The major is highly suitable for students who wish to pursue career pathways in a wide variety of disciplines. These include graduate studies in the biological, public health and medical, dental, and veterinary professions, conservation and natural resource management, teaching at the K-12 level, positions in the local, state and federal governments, non-profit/non-governmental organizations, and private sector opportunities such as environmental consulting agencies. Students intending to go to medical school should compare degree requirements to health students meet with an LSA pre-health advisor.

Exclusions: Students who elect a major in Ecology, Evolution, and Biodiversity may not elect the following majors: Biology; General Biology; Ecology and Evolutionary Biology; Microbiology; Plant Biology; or Biochemistry. They also may not elect an academic minor in Biology; Ecology and Evolutionary Biology; Plant Biology; Chemistry; or Biochemistry.

How do I declare?
Students interested in any major in the biological sciences are encouraged to meet with an advisor to discuss their academic plans as soon as possible! Students need not have completed all of the major prerequisites to declare, but should have completed the biology introductory sequence with a 2.0 or better and be in good academic standing. Make an advising appointment online through the Biology website: www.lsa.umich.edu/biology.

What courses should I take first?
The biological science introductory sequence consists of: BIOLOGY 171, BIOLOGY 172 or 174, and BIOLOGY 173. (Students with an appropriate AP score receive credit for BIOLOGY 195, which is the equivalent of BIO 171 & 172/174, but does NOT grant credit for 173.) Students should take 171 or 172/174 first and then follow with the second lecture course and 173. (Note that the introductory biology sequence courses cannot be taken pass/fail.)

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<tr>
<th>BIOLOGY 171</th>
<th>BIOLOGY 172 or 174</th>
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<tr>
<td>...focuses on ecology, biodiversity, and genetics and evolutionary processes. Students engage with biological hypotheses dealing with prominent current issues such as human evolutionary origins, emerging diseases, conservation biology, and global change.</td>
<td>(prerequisite: prior or concurrent credit for CHEM 130) ...focuses on how cells, organs, and organisms work. (174 covers the same material as 172 but is geared toward students who prefer a more problem-solving approach to understand biology, rather than a more traditional lecture-based course.)</td>
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<tr>
<th>BIOLOGY 173</th>
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<td>(prerequisite = BIOLOGY 171, 172, 174, or 195) ...is the accompanying lab component to the introductory sequence. The course provides an integrated introduction to experimental biology. Topics focus on biochemistry, molecular genetics, evolution, and ecology.</td>
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How do I get involved in research?
Independent research is a wonderful opportunity to take an active role in studying what you enjoy! Students participate in a lab, field, or modeling project in which they themselves have a say in the design, implementation, and interpretation of experiments. Please visit the Undergraduate Research web pages for the specific requirements for independent research and advice on how to choose a research area and mentor: http://www.lsa.umich.edu/biology/studentresearch.

What are the requirements for Honors?
The Program in Biology administers an Honors Program to train students to conduct independent research in the biological sciences. Participating in the honors program allows students to develop their research skills, deepen their understanding of the field, and form productive relationships with faculty and other students. The achievement is noted on the diploma and official transcript.

In addition to completing all the requirements for the major, an honors degree requires:
(1) a major GPA of at least 3.4, and
(2) the completion of a significant piece of independent research that is
(3) reported in an honors thesis and
(4) presented in a public forum.

For more information, consult the Program in Biology Honors Program information page or a Program in Biology advisor.

How do I find out about internships, study abroad, or summer programs?
Information about study abroad, faculty-led intercultural internships, faculty-led courses and field experiences, and Spring/Summer language study is available through the Center for Global and Intercultural Study. Please refer to www.lsa.umich.edu/cgis for detailed information about options.

Can I transfer courses from another institution?
The Program in Biology will review classes taken at other institutions to determine equivalency to University of Michigan Biology, EEB, and MCDB courses. If an external class is determined to be equivalent to a U-M course, it can be posted to your transcript as the U-M Biology, EEB, or MCDB course (with a "T") when you successfully complete the course and the transfer steps listed on the Biology website: www.lsa.umich.edu/biology/transfercredit. Approved equivalent courses may count toward major requirements, but transfer students are encouraged to meet with a major advisor to develop a major plan.

[Note: You are welcome to request review of a course before you take it. You will need to provide a detailed syllabus, and must obtain one from the instructor in advance.]

How can I get involved with student organizations?
There are several student organizations pertinent to biology-related majors. More detailed information is available on the Program in Biology website: www.lsa.umich.edu/biology.

- **Biology Student Alliance (BSA):** intended for Biology, CMB, Microbiology, Plant Biology, Neuroscience, and Biochemistry majors, as well as pre-med or science oriented students interested in learning more about MCDB-related topics. Email BSA-Board@umich.edu for more information.
- **Botany Undergrads Doing Stuff (BUDS):** an extremely informal group of people dedicated to botany. Contact Faculty Advisors Robyn Burnham or Laura Olsen if interested.
- **Neuroscience Students Association (NSA):** an organization for students with an interest in neuroscience. Email nsaleadteam@umich.edu for more information.
- **Society of Biology Students (SBS):** an informal group for students interested in Biology in general. Website: http://www.sitemaker.umich.edu/sbs/home or contact the Faculty Advisor, Robyn Burnham at rburnam@umich.edu for information.
- **Student Society for Stem Cell Research (SSSCR), University of Michigan – Ann Arbor Chapter:** an international network dedicated to the advancement of scientific research for cures. Website: www.umich.edu/~umssscr/index.html. Email ssscrexec@umich.edu.
ECOLOGY, EVOLUTION, AND BIODIVERSITY ELECTIVE COURSE LISTS

ECOLOGY, EVOLUTION, AND BIODIVERSITY MAJOR REQUIREMENTS

UMBS Option: Core + Field / Research - The following courses, taken at the UM Biological Station, satisfy the core *and* count toward the field/research requirement: (1) EEB 381 (General Ecology) and (2) EEB 392 (Evolution)

EEB ELECTIVES: Courses marked “UL” count as Upper-Level Electives / Courses marked “BD” satisfy the Biodiversity requirement Courses marked “FR” satisfy the Field/Research requirement (most of these are courses taught SP/SU at the UM Biological Station)

BIOLOGY 207 Microbiology (BD)
BIOLOGY 230 Introduction to Plant Biology (BD)
BIOLOGY 252 Vertebrate Evolution and Diversity (BD)
BIOLOGY 255 Plant Diversity (BD)
BIOLOGY 256 Environmental Physiology of Animals (BD)
BIOLOGY 288 Animal Diversity (BD)
EEB 300 Independent Research (FR* if 3 credits)
EEB 313 Geobiology (UL)
EEB 315 Principles of Evolution (UL)
EEB 316 Introduction to Food Systems (UL)
EEB 320 Rivers, Lakes, and Wetlands (UL)
EEB 321 Rivers, Lakes, and Wetlands at UMBS (UL, FR)
EEB 330 Biology of Birds (UL, BD, FR)
EEB 335 Biodiversity Research Seminar (UL)
EEB 341 Parasitology (UL, BD)
EEB 348 Forest Ecosystems (UL, FR)
EEB 362 Primate Evolutionary Ecology (UL)
EEB 380 Oceanography: Marine Ecology (UL, BD)
EEB 400 Independent Research (FR* if 3 credits)
EEB 401 Advanced Topics in Biology (UL)
EEB 404 Genetics, Development, and Evolution (UL)
EEB 405 Biological Station Special Topics (UL, FR)
EEB 408 Modeling for Ecology and Evolutionary Biology (UL)
EEB 412 Molecular Ecology (UL)
EEB 414 Molecular Approaches in EEB (UL)
EEB 416 Introduction to Bioinformatics (UL)
EEB 420 Plant Evolution (UL, BD)
EEB 424 Behav. Ecol. and Conserv. Biol. (UL) *No credit for EEB 492*
EEB 425 Field Skills in Wildlife Behavior (UL)
EEB 430 Modeling Infectious Diseases (UL)
EEB 431 Ecology of Animal Parasites (UL, FR, BD)
EEB 433 Ornithology (UL, BD)
EEB 436 Woody Plants: Biology and Identification (UL, BD)
EEB 440 Biology of Fishes (UL, BD)
EEB 441 The Biology of Fishes Laboratory (UL)
EEB 442 Biology of Insects (UL, BD)
EEB 443 Biology of Insects at UMBS (UL, BD, FR)
EEB 445 Biogeography (UL)
EEB 446 Microbial Ecology (UL)
EEB 450 Biology of Amphibians and Reptiles (UL, BD)
EEB 451 Biology of Mammals (UL, BD)
EEB 452 Field Mammalogy (UL, BD, FR)
EEB 453 Field Mammalogy (UL, BD, FR)
EEB 455 Ethnobotany (UL, FR)
EEB 457 Algae in Freshwater Ecosystems (UL, BD, FR)
EEB 459 Systematic Botany (UL, BD)
EEB 463 Neotropical Plant Families (UL, BD)
EEB 466 Mathematical Ecology (UL)
EEB 468 Biology of Fungi (UL, BD)
EEB 470 Microbial Diversity (UL, BD)
EEB 472 Plant-Animal Interactions (UL)
EEB 476 Ecosystem Ecology (UL)
EEB 477 Laboratory in Field Ecology (UL)
EEB 480 Model-based Statistical Inference for Ecology (UL)
EEB 482 Freshwater Ecosystems: Limnology at UMBS (UL, FR)
EEB 483 Freshwater Ecosystems: Limnology (UL)
EEB 485 Population and Community Ecology (UL)
EEB 486 Ecology and Ecology of Fish (UL, BD)
EEB 487 Ecology of Fishes (UL)
EEB 489 Soil Ecology (UL)
EEB 490 Evolution at the Population Level (UL)
EEB 491 Phylogenetic Methods and Theory (UL)
EEB 492 Behavioral Ecology (UL) *No credit for EEB 424*
EEB 493 Behavioral Ecology at UMBS (UL, FR)
EEB 494 Teaching College Science (UL)
EEB 498 The Ecology of Agroecosystems (UL)
EEB 556 Field Botany of Northern Michigan (UL, BD, FR)

*3 credits must be taken in one term to fulfill the FR req. See the Independent Research credit rules; 6 cr. max. applies.

COGNATES: Courses from other units that are currently approved for the EEB major as “Additional Courses”

ANTHRBIO 365 - Human Evolution
ANTHRBIO 368/Psych 338 - Primate Social Behavior I
ANTHRBIO/ENVIRON 461 – Primate Conservation Biology
BIOLCHEM 415* - Introductory Biochemistry
BIOMEDE 231 - Introduction of Biomechanics
CHEMISTRY* - Any course numbered 230 or above
CLIMATE/EARTH/SPACE 320 - Earth Systems Evolution
CMPLYXSYS 501 - Introduction to Complex Systems
CMPLYXSYS 530 - Computer Modeling of Complex Systems
EARTH 418 - Paleontology
EARTH 436 – Studies in Stratigraphy, Paleo., and Sedimentology
EARTH 437 - Evolution of Vertebrates
EARTH/ENVIRON 450 – Ecosystem Science in the Rockies
ENVRN 310 - Toxicology: Study of Environ. Chems. & Disease
ENVRN 317 - Conservation of Biological Diversity
EPID 543 - Virus Diseases
EPID 560 - Mechanisms of Bacterial Pathogenesis
HUMGEN 541 – Molecular Genetics
MATHEMATICS* - Courses numbered 200 or above
MICRBIOL 405 – Medical Microbiology and Infectious Disease
MICRBIOL 415 – Virology
MICRBIOL/INTMED 460 – Eukaryotic Microbiology
PHYSICS/BIOPHYS 290* – Physics of the Body and Mind
PSYCH 337 - Hormones and Behavior
STATS 250 or 280* – Intro. to Statistics and Data Analysis
STATS 401* – Applied Statistical Methods II

*Courses used as prerequisites or core options may not double-count as additional courses.

Updated: 6/13/17 lcc
**ECOLOGY, EVOLUTION, AND BIODIVERSITY PREQUISITES:**

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<tr>
<th>Introductory Biology Sequence:</th>
<th>TERM:</th>
<th>COURSE:</th>
<th>CREDITS:</th>
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<tbody>
<tr>
<td>□ Choose Sequence A or B:</td>
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<tr>
<td>A: BIO 171, 172 or 174, &amp; 173</td>
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<td>B: BIO 195 (AP) &amp; 173</td>
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<th>Chemistry:</th>
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<tr>
<td>□ CHEM 210 &amp; 211</td>
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<th>Quantitative Analysis Sequence:</th>
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<td>□ Quantitative Analysis 1: MATH 115, 120 (AP), 175, 185, or 295</td>
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<tr>
<td>□ Quantitative Analysis 2: One course from: MATH 116, 121 (AP), 156, 176, 186, or 296; STATS 180 (AP), 250 or 280; STATS 400-level or above (min. 3 credits); BIOLOGY 202; BIOPHYS/PHYSICS 290; EECS 203 or 280; EARTH 468; or other course with a MATH 115 prereq. approved by a major advisor [Note: Any course used to fulfill this requirement cannot also be used as a major elective; i.e., a course cannot “double-count.”]</td>
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<th>Physics:</th>
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<td>□ PHYSICS I (lecture + lab): One of the following combinations: PHYSICS 125 &amp; 127; 135 &amp; 136; 140 &amp; 141; or 160 &amp; 161. [PHYSICS 139 (AP) will also fulfill this requirement.]</td>
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**ECOLOGY, EVOLUTION, AND BIODIVERSITY MAJOR:**

**EEB Major Core:**

| □ Ecology: BIOLOGY 281 and EEB 372 *OR* EEB 381 (UMBS) |     |     |     |
| □ Genetics: BIOLOGY 305 |     |     |     |
| □ Evolution: EEB 390, 391, or 392 |     |     |     |
| □ Biochemistry or Quantitative Analysis 3 (min. 3 credits): MCDB 310; BIOLCHEM 415; CHEM 351; STATS 401, 403, 412, or 425; EECS 281 or 376; EEB 408, 430, or 490; or a second (non-AP) course at the 200-level or above from the QA2 options above |     |     |     |
| □ EEB Capstone: EEB 410 |     |     |     |

**Upper-Level Electives for EEB (UL) (2 courses, minimum 6 credits):**

| □ EEB 300-level or above (EEB/MCDB 300/400, 301, 302, 397, 399, 499, 800, and non-specific (departmental) transfer courses are EXCLUDED.) |     |     |     |
| □ EEB or MCDB 300-level or above (EEB/MCDB 300/400, 301, 302, 397, 399, 499, 800, and non-specific (departmental) transfer courses are EXCLUDED.) |     |     |     |

**EEB Requirements (these may overlap with the Major Core or Electives):**

| □ Field or Research Experience (FR): One course from the approved list (attached). |     |     |     |
| □ Biodiversity Focus (BD): One course from the approved list (attached). |     |     |     |
| □ EEB/MCDB 300 or 400 (Independent Research), elected for a min. of 3 credits in a single term, may be used to fulfill the FR req. (6 credit max. applies; see CONSTRAINTS below.) |     |     |     |

**Additional Courses:**

| □ Choose additional BIOLOGY, EEB, and MCDB courses at the 200-level and above, to reach 30 major credit hours. |     |     |     |
| □ BIO 241, EEB/MCDB 301, 302, 800, MCDB 412, and non-specific (departmental) transfer courses are EXCLUDED. |     |     |     |
| □ A max. of 2 approved cognate courses may be used as additional courses; see attached list. |     |     |     |

**CONSTRAINTS:**

| □ Prerequisites, introductory science courses, and non-specific (departmental) transfer courses are EXCLUDED from the 30 cr. required for the major. |     |     |     |
| □ A maximum of 6 credits of independent research (BIO 200, EEB/MCDB 300 or 400) may be counted toward the major. |     |     |     |

**Total Credits and GPA Requirement for EEB:**

| □ Minimum 30 cr. in Major |     |     |     |
| □ Minimum 2.0 GPA in Major: GPA is calculated from all mandatory prerequisites, all courses used for major requirements (including cognates), and all courses in BIOLOGY, EEB, and MCDB. |     |     |     |