Molecular Environmental Biology Major Requirements (2020-2021)

**Lower Division Requirements:** (note: all courses must be taken for a letter grade)

- ESPM Environmental Science Core: 1 course from ESPM 2, 6, C10 (L&S C30V), 15, or C46
- ESPM Social Science Core: 1 course from ESPM 5, C11 (L&S C30U), C12 (ENG C77), C22AC, 50AC, or 60
- One course (3-4 units) in Arts & Literature, Historical Studies, or Philosophy & Values
- One course (3-4 units) in Social & Behavioral Sciences or International Studies

Select courses from "7 Breadth" categories: [https://ls.berkeley.edu/seven-course-breadth-requirement](https://ls.berkeley.edu/seven-course-breadth-requirement)

- Two courses in Reading & Composition (8 units): R1A & R1B

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<tr>
<th>Math: 2 semesters</th>
<th>Chemistry: 3 semesters</th>
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<td>And choose one of the following (calc OR stats):</td>
<td>Chem 3A/L: Organic Chemistry I [5]</td>
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<td>Statistics: 2, C8, 20, PH 141, 142 (or W142), or Stat 131A</td>
<td>Statistics is required for many pre-health and environmental research programs.</td>
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<th>Physics: 1 semester</th>
<th>Biology: 2 semesters</th>
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<td>*note: Physics 8B is required for many pre-health programs</td>
<td>Bio 1B: General Biology [4]</td>
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**Upper Division Requirements:** (note: all courses must be taken for a letter grade)

- 15 upper division units must be taken in Rausser College (EEP, ESPM, NST, PMB, ERG)

**Biological Core:** Select two courses from area A and two courses from area B. Complete 12 units in Area of Concentration. Complete lab requirement (see below).

*With the exception of the lab courses, each course can be used to satisfy only one requirement. Core courses cannot overlap with the Area of Concentration requirement.*

**Area A: Genetics, Molecular, Cell, and Developmental Biology**

- CHEM 135: Chemical Biology (3)
- ESPM 108B: Environmental Change Genetics (3) *lab included*
- IB 141: Human Genetics (3)
- IB 161: Population and Evolutionary Genetics (4)
- IB 162: Ecological Genetics (4)
- IB 164: Human Genetics and Genomics (4) *lab included*
- MCB C100A/CHEM C130: Biophysical Chemistry (4)
- MCB 102: Biochemistry and Molecular Biology (4)
- MCB 104: Genetics, Genomics, and Cell Biology (4)
- MCB 110: Molecular Bio: Macromolecular Synthesis and Cell Fxn (4)
- MCB 130: Cell and Systems Biology (4)
- MCB 133L: Physiology and Cell Biology Lab (4) *lab included*
- MCB 137L: Physical Biology of the Cell (4) *lab included*
- MCB 140: General Genetics (4)
- MCB 141: Developmental Biology (4)
- PH 162A: Public Health Microbiology (3), PH 162L (2)
- PMB C110/L/MCB C110: General Microbiology (4), PMB C112/L/MCB C112L (2)
- PMB 135: Physiology and Biochemistry of Plants (3)
- PMB 150: Plant Cell Biology (3)
- PMB 160: Plant Molecular Genetics (3)

**Area B: Ecology, Evolution, and Organismal Biology**

- ESPM C105/IB C105: Nat. Hist. Museums & Biodiv. (3) *lab included*
- ESPM 106: American Wildlife (3)
- ESPM 108A: Trees: Taxonomy, Growth & Struct. (3) *lab included*
- ESPM 111: Ecosystem Ecology (4)
- ESPM 112: Microbial Ecology (3) ESPM 112L (1)
- ESPM 113: Insect Ecology (3)
- ESPM 114: Wildlife Ecology (3)
- ESPM C115/IB C176L: Fish Ecology (3) *lab included*
- ESPM 116B: Range Ecology (4) *lab included*
- ESPM C125/GEOG C148/IB C166: Biogeography (4) *lab included*
- ESPM 131: Soil Microbial Ecology (3)
- ESPM 132: Spider Biology (4) *lab included*
- ESPM 137: Landscape Ecology (3) *lab included*
- ESPM C136/PMB C114/MCB C114: Intro Comparative Virology (4)
- ESPM 140: General Entomology (4) *lab included*
- ESPM 142: Insect Behavior (3)
- ESPM 144: Insect Physiology (3)
- IB 102LF: Introduction to California Plant Life (4) *lab included*
- IB 103LF: Invertebrate Zoology (5) *lab included*
- IB 104LF: Natural History of the Vertebrates (5) *lab included*
- IB 104LF: Natural History of the Vertebrates Lab (5) *lab included*
- IB 132: Survey of Human Physiology (4) IB 132L (2)
- IB 140: Human Reproduction (4)
- IB 148: Comparative Animal Physiology (3)
- IB 150: Evolutionary Environmental Physiology (3)
- IB 151: Plant Physiological Ecology (4), IB 151L (2)
- IB 153: Ecology (3)
- IB 154: Plant Ecology (3), IB 154L (2)
- IB 157LF: Ecosystems of California (4)
- IB 160: Evolution (4)
- IB 167: Evolution & Earth History: Genes to Fossils (4)
- IB 168L: Systematics of Vascular Plants (4) *lab included*
- IB 181L: Paleobotany: Hist. of a Greening Planet (4) *lab included*
- IB 184L: Morphology of the Vertebrate Skeleton with Lab (4)
- IB C185L/ANTH C100: Human Paleontology (5) *lab included*
- MCB 136: Physiology (4)
- MCB 113: Physiology and Cell Biology Lab (4)
- MCB 137L: Physical Biology of the Cell (4) *lab included*
- MCB 140: General Genetics (4)
- PMB C110/L/MCB C110: General Microbiology (4), PMB C112/L/MCB C112L (2)
- PMB 135: Physiology and Biochemistry of Plants (3)
- PMB 150: Plant Cell Biology (3)
- PMB 160: Plant Molecular Genetics (3)
- PMB 160: Plant Molecular Genetics (3)
- PMB 120: Biology of Algae (2) PMB 120L (2)
- PMB C113/L/MCB C113L: General Microbiology (4), PMB C112/L/MCB C112L (2)

Lab Requirement: two upper division courses — either in the Biological Core or Area of Concentration - must include a lab. 3-four independent study lab units (H196, 199, UGIS 192C) may be used to fulfill one lab requirement.

The Moorea Program (13-unit ESPM C107/IB 158LF: Biology & Geomorphology of Tropical Islands), will count as 4 units towards any area of concentration, one Area B requirement, and one lab course. *Many study abroad programs will count in these areas—for specific program info, talk to the major advisor.*

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See reverse side for Areas of Concentration

If you have questions about the MEB major, please contact meb.ugrad@berkeley.edu

revised June 2020
**Area of Concentration Requirement:** Select 12 units from one concentration. Up to four research units (e.g., 199, H196, UGIS) may be applied to the concentration.

### Molecular Environmental Biology
- ESPM C103/BIB C156: Principles of Conservation Biology (4)
- ESPM C105: Natural History of California Nature (3)
- ESPM C115: Natural Resource Ecology (3)
- ESPM C126/BIB C144: Animal Behavior (4)
- ESPM C142: Molecular Approaches to Env. Problem Solving (2)
- ESPM C145: Animal Communication (3)
- ESPM C158: Biodiversity Conservation in Working Landscapes (4) lab included
- ESPM C159: Management & Conservation of Rangeland Ecosystems (3)
- ESPM C162: Molecular Approaches to Env. Problem Solving (2)
- IB 104F: Natural History of the Vertebrates (5) lab included
- IB 133: Mechanics of Organisms (4)
- IB 135L/BIOL C136L: ENGL C1450: Mechanics of Organisms Lab (3)
- IB C143A/PSYCH C113: Biological Clocks: Physiology & Behavior (3)
- IB C143B/PSYCH C116: Hormones & Behavior (3)
- IB 146FL: Behavioral Ecology (5) lab included
- IB 148: Comparative Animal Physiology (3)
- IB 173FL: Mammalogy (5) lab included
- IB 174FL: Ornithology with Laboratory (4)
- IB 175FL: Herpetology with Laboratory (4)
- IB 177FL: Ichthyology (4) lab included
- IB 184L: Morphology of the Vertebrate Skeleton with Laboratory (4)
- PSYCH 121: Animal Cognition (3)

### Global Change Biology
- CIV ENG 107: Climate Change Mitigation (3)
- ENRES 101: Ecology & Society (3)
- ENRES 102: Quantitative Aspects of Global Environmental Problems (4)
- ENVECON C102: Natural Resource Ecology (3)
- ENVECON C175/IAS C175: The Economics of Climate Change (4)
- EPS 102: History & Evolution of Planet Earth (4)
- EPS 115: Stratigraphy & Earth History (4)
- EPS C181/GEOL C182: Atmospheric Physics & Dynamics (3)
- ESPM 108B: Environmental Change Genetics (3) lab included
- ESPM C125/GEOL C148/IB C166: Biogeography (4) lab included
- ESPM C137: Landscape Ecology (3) lab included
- ESPM C151: Global Change Science (3)
- ESPM C157: Data Science in Global Change Ecology (4) lab included
- ESPM C162/PH C160: Environmental Health & Development (4)
- ESPM C170/EP C183: Carbon Cycle Dynamics (3)
- ESPM C192: Molecular Approaches to Env. Problem Solving (2)
- GEG 140A: Physical Landscapes: Process and Form (4)
- GEG 142: Climate Dynamics (4)
- GEG 143: Global Change Biogeochemistry (3)
- GEG 149B: Climate Impacts and Risk Analysis (3)
- GEG C188/LD ARCH C188: Geographic Information Systems (4)
- IB 154: Plant Ecology (3) IB 154L (2)
- IB 159: The Living Planet: Biosphere Impact on Earth Systems (3)
- LD ARCH 110 Ecological Analysis (3)
- LD ARCH 110L: Ecological Analysis Laboratory (2)
- PMB 124: Bioenergy (2)
- PMB 160: Environmental Plant Biology (2)

### Insect Biology/Arthropod Science
- ESPM C130/BIB C156: Principles of Conservation Biology (4)
- ESPM 105A: Sierra Nevada Ecology (4) *Summer Forestry Camp*
- ESPM 111: Ecosystem Ecology (4)
- ESPM 112: Microbial Ecology (3)
- ESPM 112L: Microbial Metagenomic Data Analysis Lab (1)
- ESPM 113: Insect Ecology (3)
- ESPM 114: Wildlife Ecology (3)
- ESPM C115A/IB C171: Freshwater Ecology (3)
- ESPM C115B/IB C176L: Fish Ecology (3) lab included
- ESPM 1168: Range Ecology (4) lab included
- ESPM 117: Urban Garden Ecossystems (4) lab included
- ESPM 118: Agricultural Ecology (4)
- ESPM C125/GEOL C148/IB C166: Biogeography (4) lab included
- ESPM C130: Soil Microbiology (3)
- ESPM 134: Fire, Insects, & Diseases in Forest Ecosystems (3)
- ESPM 137: Landscape Ecology (3) lab included
- ESPM 147: Field Entomology: “Ants,” “Beetles,” & “Spiders” (1 unit each)
  All three courses = one lab course
- ESPM C148/GEOL C148/IB C166: Biogeography (4) lab included
- ESPM C151: Global Change Science (3)
- ESPM C157: Data Science in Global Change Ecology (4) lab included
- ESPM C159/NST C114: Pesticide Chemistry & Toxicology (3)
- ESPM C157: Data Science in Global Change Ecology (4) lab included
- ESPM C1515/BIB C154: Animal Behavior (4)
- ESPM 132: Spider Biology (4) lab included
- ESPM 140: General Entomology (4) lab included
- ESPM 142: Insect Behavior (3)
- ESPM 147: Field Entomology: “Ants,” “Beetles,” & “Spiders” (1 unit each)
  All three courses = one lab course
- ESPM 157: Data Science in Global Change Ecology (4) lab included
- ESPM C152: Molecular Approaches to Env. Problem Solving (2)
- IB 102FL: Introduction to California Plant Life (4) lab included
- IB 103FL: Invertebrate Zoology (5) lab included
- IB 104FL: Natural History of the Vertebrates (5) lab included
- IB 160: Evolution (4)
- IB 168L: Systematics of Vascular Plants (4) lab included
- IB 173FL: Mammalogy (5) lab included
- IB 174FL: Ornithology (4) lab included
- IB 175FL: Herpetology (4) lab included
- IB 177FL: Ichthyology (4) lab included
- IB 183L: Evolution of the Vertebrates (4) lab included
- IB 184L: Morphology of the Vertebrate Skeleton with Laboratory (4)
- PMB C110L/IB C111L: Biology of Fungi (4) lab included
- PMB 113: California Mushrooms (3) lab included
- PMB C116/MCB C116: Microbial Diversity (3)
- PMB 120: Biology of Algae (2) PMB 120L (2)