## Molecular Environmental Biology Major Requirements (2019-2020)

### 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

### Upper Division Requirements: (note: all courses must be taken for a letter grade)

- 15 upper division units must be taken in the College of Natural Resources (EEP, ESPM, NST, PMB, ERG)

#### Biological Core:
Select two courses from area A and two courses from area B.
Complete lab requirement, and 12 units in Area of Concentration.

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

#### Area A: 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 (3) **lab included**
- MCB 140: General Genetics (4)
- MCB 141: Developmental Biology (4)
- PH 162A: Public Health Microbiology (3), PH 162L (2)
- PMB C112/MCB C112: General Microbiology (4), PMB C112L/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 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 C115C/IB C176L: Fish Ecology (3) **lab included**
- ESPM 116B: Range Ecology (4) **lab included**
- ESPM C125/GEOG C148/IB C166: Biogeography (4)
- ESPM 131: Soil Microbial Ecology (3)
- ESPM 132: Spider Biology (4) **lab included**
- ESPM 137: Landscape Ecology (3) **lab included**
- ESPM C138/PMB C114/MCB C114: Intro Comparative Virology (4)
- ESPM 140: General Entomology (4) **lab included**
- 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: 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 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 C185L/ANTH C100: Human Paleontology (5) **lab included**
- IB C192 now counts towards any area of concentration
- MCB 136: Physiology (4)
- NST 103: Nutrient Function and Metabolism (3)
- PMB C110L/IB C110L: Biology of Fungi (4) **lab included**
- PMB C116/MCB C116: Microbial Diversity (3)
- PMB 120: Biology of Algae (2) PMB 120L (2)

### Lab Requirement: two upper division courses – either in the Biological Core or Area of Concentration – must include a lab.

3–4 independent study lab units (UGIS 192C, H196, 199) may be used to fulfill one lab requirement.

See reverse side for Areas of Concentration

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

revised February 2019
**ANIMAL HEALTH & BEHAVIOR**

- ESPM C103/IB C156: Principles of Conservation Biology (4)
- ESPM C107/IB C156: Principles of Conservation Biology (4) lab included
- PMB 120: Biology of Algae (2) PMB 120L (2) lab included
- ESPM 113: Insect Ecology (3)
- IB 102LF: Introduction to California Plant Life (4) lab included
- B 104LF: Natural History of the Vertebrates (5) lab included
- IB 105: Medical Parasitology (4)
- IB 116L: Medical Parasitology (4) lab included
- IB 117: Medical Entomology (2)
- IB 118: Agricultural Ecology (4)
- IB 116: Medical Parasitology (4) lab included
- IB 117: Medical Entomology (2)
- IB 135: Mechanics of Organisms (4)
- IB 135L/BIO ENG C136L/EL ENG C145O: Mechanics of Organisms Lab (3)
- IB 153L: Behavioral Approaches to Env. Problem Solving (2)
- IB 172LF: Herpetology with Laboratory (4)
- 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)
- ENVECON C102/ECON C102: Natural Resource Economics (4)
- ENB 301: Ecology & Society (3)
- ENE RES 102: Quantitative Aspects of Global Environmental Problems (4)
- 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/ GEOG C136/ELENG C1450: Mechanics of Organs Lab (3)
- ESPM 108B: Environmental Change Genetics (3) lab included
- ESPM 137: Landscape Ecology (3) lab included
- ESPM 152: Global Change Biology (3)
- ESPM 157: Data Science in Global Change Ecology (4) lab included
- ESPM 162: Bioethics and Society (4)
- ESPM 162A: Health, Medicine, Society, and Environment (4)
- ESPM 165/LPH C160: Environmental Health & Development (4)
- ESPM C159/NST C159: Human Diet (4)
- ESPM C159/NST C159: Human Diet (4) lab included
- IB 131L: General Human Anatomy (2)
- IB 131L: General Human Anatomy Lab (2)
- IB 137: Human Endocrinology (4)
- IB 140: Biology of Human Reproduction (4)
- IB 143A/PSYCH C113: Biological Clocks: Physiology & Behavior (3)
- IB 143B/PSYCH C116: Hormones & Behavior (3)
- IB 146L: Behavioral Ecology (5) lab included
- IB 148: Comparative Animal Physiology (3)
- IB 173LF: Mammalogy (5) lab included
- IB 174LF: Ornithology with Laboratory (4)
- IB 187: Meteorology with Laboratory (4)
- IB 184L: Morphology of the Vertebrate Skeleton with Laboratory (4)
- PSYCH 110: Introduction to Biological Psychology (3)

**ECOLOGY**

- ESPM C103/IB C156: Principles of Conservation Biology (4)
- ESPM C104/ENVECON C115: Modeling & Management of Bio. Resources (4)
- ESPM 105A: Sierra Nevada Ecology (4) (Summer Forestry Camp)
- ESPM 111: Ecosystem Ecology (4)
- IB 112: Microbial Ecology (3)
- IB 112L: Microbial Metagenomic Data Analysis Lab (1)
- IB 113: Insect Ecology (3)
- IB 114: Wildlife Ecology (3)
- IB 115A/IB C171: Freshwater Ecology (3) lab included
- IB 116L: Range Ecology (4) lab included
- IB 117: Urban Garden Ecosystems (4) lab included
- IB 118: Agricultural Ecology (4)
- IB 120: Environmental Plant Biology (2)
- IB C130/GEOL C136: Terrestrial Hydrology (4)
- IB 131: Soil Microbiology (3)
- IB 134: Fire, Insects, & Diseases in Forest Ecosystems (3)
- IB 137: Landscape Ecology (3) lab included
- IB 147: Field Entomology: “Ants,” “Beetles,” & “Spiders” (1 unit each)
  All three courses = one lab course
  All three courses = one lab course
  All three courses = one lab course

**ENVIRONMENT & HUMAN HEALTH**

- ANTHRO 135: Paleoethnobotany: Archaeological Methods & Lab Techniques (4) lab included
- ESPM C126/IB C144: Animal Behavior (4)
- ESPM C133/PMB C144: Animal Behavior (4)
- PMB 121: Bioenergy (2)
- PMB 122: Bioenergy (2)
- PMB 120: Biology of Algae (2) PMB 120L (2)

**INSECT BIOLOGY/ARTHROPOD SCIENCE**

- Note: ESPM 140: General Entomology is required for this concentration
  - ESPM C105/IB C105: Nat. Hist. Museums & Biodiv. (3) lab included
  - ESPM 113: Insect Ecology (3)
  - ESPM 132: Spider Biology (4) lab included
  - ESPM 134: Fire, Insects, & Diseases in Forest Ecosystems (3)
  - ESPM 140: General Entomology (4) lab included
  - ESPM 142: Insect Behavior (3)
  - ESPM 144: Insect Physiology (3)
  - ESPM 147: Field Entomology: “Ants,” “Beetles,” & “Spiders” (1 unit each)
  - ESPM 148/NST C114: Pesticide Chemistry & Toxicology (3)
  - ESPM 172: Photogrammetry & Remote Sensing (3) lab included
  - ESPM C159: Molecular Approaches to Env. Problem Solving (2)

**BIODIVERSITY**

- ESPM C103/IB C156: Principles of Conservation Biology (4)
- ESPM C105/IB C105: Nat. Hist. Museums & Biodiv. (3) lab included
- IB 106: American Wildlife (3)
- ESPM 108A: Trees: Taxonomy, Growth & Structures (3) lab included
- ESPM C125/GEOL C148/IB C166: Biogeography (4)
- ESPM 132: Spider Biology (4) lab included
- ESPM 140: General Entomology (4) lab included
- ESPM 142: Field Entomology: “Ants,” “Beetles,” & “Spiders” (1 unit each)
  All courses only = one lab course
- ESPM 157: Data Science in Global Change Ecology (4) lab included
- ESPM C192: Molecular Approaches to Env. Problem Solving (2)
- 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 160: Evolution (4)
- IB 168L: Systematics of Vascular Plants (4) lab included
- IB 173LF: Mammalogy (5) lab included
- IB 174LF: Ornithology (4) lab included
- IB 175LF: Herpetology (4) lab included
- IB 183L: Evolution of the Vertebrates (4) lab included
- PMB C110/LPH C110L: 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)

The Moorea Program (13-unit ESPM C107/IB C158/Geog C142: Biology & Geomorphology of Tropical Islands), it 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.

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

revised February 2019