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

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

<table>
<thead>
<tr>
<th>Math</th>
<th>Chemistry</th>
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<tbody>
<tr>
<td>Statistics: 2, C8, 20, PH 141, 142 (or W142), or Stat 131A</td>
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</tbody>
</table>

#### Physics


*note: Physics 1B is required for many pre-health programs

<table>
<thead>
<tr>
<th>Physics</th>
<th>Biology</th>
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<tbody>
<tr>
<td>*note: Physics 1B 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 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. Core courses cannot overlap with the Area of Concentration requirement.**

<table>
<thead>
<tr>
<th>Area A: Genetics, Molecular, Cell, and Developmental Biology</th>
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<tbody>
<tr>
<td>CHEM 135: Chemical Biology (3)</td>
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<tr>
<td>ESPM 108B: Environmental Change Genetics (3) lab included</td>
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<tr>
<td>IB 141: Human Genetics (3)</td>
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<tr>
<td>IB 161: Population and Evolutionary Genetics (4)</td>
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<td>IB 162: Ecological Genetics (4)</td>
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<td>MCB C100A/CHEM C130: Biophysical Chemistry (4)</td>
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<td>MCB 102: Biochemistry and Molecular Biology (4)</td>
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<td>MCB 104: Genetics, Genomics, and Cell Biology (4)</td>
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<td>MCB 130: Cell and Systems Biology (4)</td>
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<thead>
<tr>
<th>Area B: Ecology, Evolution, and Organisinal Biology</th>
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<tbody>
<tr>
<td>ESPM 108A: Trees: Taxonomy, Growth &amp; Struct. (3) lab included</td>
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<tr>
<td>ESPM 111: Ecosystem Ecology (4)</td>
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<tr>
<td>ESPM 112: Microbial Ecology (3) ESPM 112L (1)</td>
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<tr>
<td>ESPM 113: Insect Ecology (3)</td>
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<tr>
<td>ESPM 114: Wildlife Ecology (3)</td>
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<tr>
<td>ESPM C115C/IB C176L: Fish Ecology (3) lab included</td>
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<tr>
<td>ESPM 116B: Range Ecology (4) lab included</td>
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<tr>
<td>ESPM C125/GEOG C148/IB C166: Biogeography (4)</td>
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<tr>
<td>ESPM 131: Soil Microbial Ecology (3)</td>
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<tr>
<td>ESPM 132: Spider Biology (4) lab included</td>
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<tr>
<td>ESPM 137: Landscape Ecology (3) lab included</td>
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<tr>
<td>ESPM C136/PMB C114/MCB C114: Intro Comparative Virology (4)</td>
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<tr>
<td>ESPM 140: General Entomology (4) lab included</td>
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<tr>
<td>ESPM 142: Insect Behavior (3)</td>
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<tr>
<td>ESPM 144: Insect Physiology (3)</td>
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<tr>
<td>IB 102LF: Introduction to California Plant Life (4) lab included</td>
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<tr>
<td>IB 103LF: Invertebrate Zoology (5) lab included</td>
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<tr>
<td>IB 104LF: Natural History of the Vertebrates (5) lab included</td>
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</table>

#### 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.

The Moorea Program (13-unit ESPM C107/IB C158/Geog C142: 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.*
### Molecular Environmental Biology Major Requirements

**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.

#### ANIMAL HEALTH & BEHAVIOR
- ESPM C103/IB C156: Principles of Conservation Biology (4)
- ESPM 106: American Wildlife (3)
- ESPM 114: Wildlife Ecology (3)
- ESPM C126/IB C144: Animal Behavior (4)
- ESPM 142: Insect Behavior (3)
- ESPM C156/IB C145: Animal Communication (3)
- ESPM 157: Data Science in Global Change Ecology (4) lab included
- ESPM 181: Biodiversity Conservation in Working Landscapes (4) lab included
- ESPM 166: Management & Conservation of Rangeland Ecosystems (4)
- ESPM C192: Molecular Approaches to Env. Problem Solving (2)
- IB 104FL: Natural History of the Vertebrates (5) lab included
- IB 135: Mechanics of Organisms (4)
- IB 135L/BIO EN 136EL/EN 1450: 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 184L: Morphology of the Vertebrate Skeleton with Laboratory (4)
- PSYC 121: Animal Cognition (3)

#### ENVIRONMENT & HUMAN HEALTH
- ANTHRO 135: Paleoenvironmental Science and Lab Techniques (4) lab included
- ESPM C126/IB C144: Animal Behavior (4)
- ESPM C138/PMB C114: MCB C114: Intro to Comparative Virology (4) lab included
- ESPM C148/IB C144: Pesticide Chemistry & Toxicology (3)
- ESPM C152: Global Change Biology (3)
- ESPM 157: Data Science in Global Change Ecology (4) lab included
- ESPM 158: Biodiversity Conservation in Working Landscapes (4) lab included
- ESPM C159/NST C159: Human Diet (4)
- ESPM 162: Bioethics and Society (4)
- ESPM 162A: Health, Medicine, Society and Environment (4)
- IB C167/PH C160: Bacterial Pathogenesis (3)
- IB 116L: Medical Parasitology (4) lab included
- IB 117: Medical Ethnobotany (2)
- IB 117FL: Medical Ethnobotany Laboratory (2)
- IB 131: General Human Anatomy (3)
- IB 131L: General Human Anatomy Lab (2)
- IB 137: Human Endocrinology (4)
- IB 140: Biology of Human Reproduction (4)
- IB C143A/PSYCH C113: Biological Clocks: Physiology & Behavior (3)
- IB C143B/PSYCH C116: Hormones & Behavior (3)
- MCB C156: Molecular Endocrinology (3)
- MCB 150: Molecular Immunology (4)
- MCB 165: Neurobiology of Disease (3)
- NST 103: Nutrient Function & Metabolism (3)
- NST 108A: Intro & Application of Food Science (3)
- NST 110: Toxicology (4)
- NST 160: Metabolic Bases of Human Health & Diseases (4)
- NST 166: Nutrition in the Community (3)
- PMB C103/MCB C103/PH C102: Bacterial Pathogenesis (3)
- PH 101: A Sustainable World: Challenges and Opportunities (3)
- PH 116: Soc. Political, & Ethical Issues in Health & Medicine (3) P/NP okay
- PH 150B: Intro to Environmental Health Sciences (3)
- PSYC 110: Intro to Biological Psychology (3)

#### GLOBAL CHANGE BIOLOGY
- CIV ENG 107: Climate Change Mitigation (3)
- ENVECON C102/ECON C102: Natural Resource Economics (4)
- ENR RES 101: Ecology & Society (3)
- ENR RES 102: Quantitative Aspects of Global Environmental Problems (4)
- ENV C117/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 C139: Atmospheric Physics & Dynamics (3)
- ESPM 108B: Environmental Change Genes (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 C167/PH C160: Environmental Health & Development (4)
- ESPM C170/PSYCH C113: Biological Clocks: Physiology & Behavior (3)
- ESPM C173/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 184L: Morphology of the Vertebrate Skeleton with Laboratory (4)
- PSYC 121: Animal Cognition (3)

#### INSECT BIOLOGY/ARTHROPOD SCIENCE
- Note: ESPM 140: General Entomology is required for this concentration
- ESPM C105/C105S: Nat. Hist. Museums & Biodiv. (3) lab included
- ESPM 113: Insect Ecology (3)
- ESPM 132: Spider Biology (4) lab included
- ESPM 136: Fire, Insects, & Diseases in Forest Ecosystems (3)
- ESPM 140: General Entomology (4) lab included
- ESPM 142: Insect Behavior (3)
- ESPM 146: Insect Physiology (3)
- ESPM 147: Field Entomology: "Ants," "Beetles," & "Spiders" (1 unit each)
  - All three courses = one lab course
- ESPM C148/NST C114: Pesticide Chemistry & Toxicology (3)
- ESPM 152: Data Science in Global Change Ecology (4) lab included
- ESPM 172: Photogrammetry & Remote Sensing (3) lab included
- ESPM C192: Molecular Approaches to Env. Problem Solving (2)

#### ECOTOLOGY
- ESPM C103/IB 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 113L: Microbial Metagenomic Data Analysis Lab (1)
- ESPM 113L: Microbial Metagenomic Data Analysis Lab (1)
- ESPM 113L: Microbial Metagenomic Data Analysis Lab (1)
- ESPM 114: Wildlife Ecology (3)
- ESPM C115A/IB C171: Freshwater Ecology (3)
- IB 115L/IB C176L: Fish Ecology (3) lab included
- ESPM 116B: Range Ecology (4) lab included
- ESPM 117: Urban Garden Ecosystems (4) lab included
- ESPM 118: Agricultural Ecology (4)
- ESPM C130/GEOG C130: Terrestrial Hydrology (4)
- ESPM 131: 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 152: Global Change Biology (3)
- ESPM 157: Data Science in Global Change Ecology (4) lab included
- ESPM 158: Biodiversity Conservation in Working Landscapes (4) lab included
- ESPM 173: Introduction to Ecological Data Analysis (3) lab included
- ESPM 174: Design & Analysis of Ecological Research (4) lab included
- ESPM 181A: Fire Ecology (4) lab included
- ESPM C192: 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 108: 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 183L: Evolution of the Vertebrates (4) lab included
- IB 184L: Morphology of the Vertebrate Skeleton with Laboratory (4)
- PMB C110/IB 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)

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

revised September 2019