The PhD in Marine and Environmental Sciences (MES) program provides students with advanced course work and training in the concentration areas of marine sciences, geosciences, sustainability sciences, and ecology and evolutionary biology.

Students must pass three examinations during the course of their graduate studies:

1. An oral examination by the student’s dissertation committee.
2. A proposal defense presented to the student’s dissertation committee that explains the research areas that the student proposes to work in.
3. A defense of the student’s written dissertation consisting of a public seminar, public question-and-answer period, and private defense of their work to their dissertation committee. Dissertation committees consist of at least four Northeastern faculty and one external faculty member.

A cumulative GPA of 3.000 is required for graduation. All PhD students are required to have at least two first-authored publications submitted to or accepted in a peer-reviewed journal prior to their defense. The PhD will be awarded following submission of a dissertation, approved by the candidate's dissertation committee, to the College of Science.

Program Requirements

Bachelor's Degree Entrance

Complete all courses and requirements listed below unless otherwise indicated.

Milestones

Annual review
Dissertation committee
Qualifying examination
Dissertation proposal
Candidacy
First-author publication
Dissertation defense

Core Requirements

<table>
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<tr>
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<th>Hours</th>
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<td>ENVR 6500</td>
<td>Biostatistics and ENVR 6501</td>
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<td>EEMB 5522 and EEMB 5523</td>
<td>Experimental Design Marine Ecology and Lab for EEMB 5522</td>
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<td>Alternative statistics course as approved by graduate committee</td>
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Research

Complete the following (repeatable) course twice: 8

- EEMB 8984 Research

Concentration

Complete one of the following concentrations:

- Ecology and Evolutionary Biology (p. 1)
- Sustainability Sciences (p. 1)

ECOLOGY AND EVOLUTIONARY BIOLOGY

<table>
<thead>
<tr>
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<tr>
<td>EEMB 7102</td>
<td>Seminar in Ecology and Evolutionary Biology</td>
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<td>Seminar in Marine and Environmental Sciences</td>
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<tr>
<td>EEMB 7104</td>
<td>Seminar in Geosciences</td>
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Readings

- EEMB 8102 Readings in Ecology and Evolutionary Biology 2

Concentration-Specific Electives

Complete 12 semester hours from the following: 12

- ENVR 5210 Environmental Planning
- ENVR 5242 and ENVR 5243 Ancient Marine Life and Lab for ENVR 5242
- ENVR 5260 Geographical Information Systems
- EEMB 5130 Ecological Dynamics and Lab for EEMB 5130
- EEMB 5504 Biology of Corals
- EEMB 5506 Biology and Ecology of Fishes
- EEMB 5508 Marine Birds and Mammals and Lab for EEMB 5508
- EEMB 5512 Tropical Terrestrial Ecology
- EEMB 5516 Oceanography and Lab for EEMB 5516
- EEMB 5518 Ocean and Coastal Processes
- EEMB 5520 Coral Reef Ecology
- EEMB 5528 Marine Conservation Biology
- EEMB 5532 Physiological and Molecular Marine Ecology
- EEMB 5534 Marine Invertebrate Zoology and Botany and Lab for EEMB 5534
- EEMB 5536 Ocean and Coastal Sustainability

Substitutions may be made with approval of graduate committee.

SUSTAINABILITY SCIENCES

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<tr>
<td>EEMB 7103</td>
<td>Seminar in Sustainability Sciences</td>
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<td>EEMB 7104</td>
<td>Seminar in Geosciences</td>
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Readings
EEMB 8103 Readings in Sustainability Sciences 2

Concentration-Specific Electives
Complete 12 semester hours from the following: 12
ENVR 5115 Advanced Topics in Environmental Geology
ENVR 5260 Geographical Information Systems
EEMB 5130 and EEMB 5131 Ecological Dynamics and Lab for EEMB 5130
EEMB 5506 Biology and Ecology of Fishes
EEMB 5516 Oceanography and EEMB 5517 and Lab for EEMB 5516
EEMB 5518 Ocean and Coastal Processes
EEMB 5528 Marine Conservation Biology
EEMB 5536 Ocean and Coastal Sustainability
INSH 5301 Introduction to Computational Statistics
INSH 5302 Information Design and Visual Analytics
INSH 6406 Analyzing Complex Digitized Data
PPUA 5261 Dynamic Modeling for Environmental Decision Making
PPUA 7346 Resilient Cities
POLS 7202 Quantitative Techniques
POLS 7334 Social Networks
Substitutions may be made with approval of graduate committee.

GEOSCIENCES
Code Title Hours
Seminars
EEMB 7104 Seminar in Geosciences 2
Complete one of the following: 2
EEMB 7101 Seminar in Marine and Environmental Sciences
EEMB 7102 Seminar in Ecology and Evolutionary Biology
EEMB 7103 Seminar in Sustainability Sciences
Readings
EEMB 8104 Readings in Geosciences 2

Concentration-Specific Electives
Complete 12 semester hours from the following: 12
ENVR 5115 Advanced Topics in Environmental Geology
ENVR 5190 Soil Science
ENVR 5210 Environmental Planning
ENVR 5240 and ENVR 5241 Sedimentary Basin Analysis and Lab for ENVR 5240
ENVR 5242 Ancient Marine Life and ENVR 5243 and Lab for ENVR 5242
ENVR 5260 Geographical Information Systems
ENVR 5270 and ENVR 5271 Glacial and Quaternary History and Lab for ENVR 5270
EEMB 5518 Ocean and Coastal Processes
EEMB 5536 Ocean and Coastal Sustainability
Substitutions may be made with approval of graduate committee.

MARINE SCIENCES
Code Title Hours
Seminars
EEMB 7101 Seminar in Marine and Environmental Sciences 2
Complete one of the following: 2
EEMB 7102 Seminar in Ecology and Evolutionary Biology
EEMB 7103 Seminar in Sustainability Sciences
EEMB 7104 Seminar in Geosciences
Readings
EEMB 8101 Readings in Marine Sciences 2

Concentration-Specific Electives
Complete 12 semester hours from the following: 12
ENVR 5242 and ENVR 5243 Ancient Marine Life and Lab for ENVR 5242
ENVR 5260 Geographical Information Systems
ENVR 5270 and ENVR 5271 Glacial and Quaternary History and Lab for ENVR 5270
EEMB 5130 Ecological Dynamics and EEMB 5131 and Lab for EEMB 5130
EEMB 5504 Biology of Corals
EEMB 5506 Biology and Ecology of Fishes
EEMB 5508 Marine Birds and Mammals and EEMB 5509 and Lab for EEMB 5508
EEMB 5516 Oceanography and EEMB 5517 and Lab for EEMB 5516
EEMB 5518 Ocean and Coastal Processes
EEMB 5520 Coral Reef Ecology
EEMB 5528 Marine Conservation Biology
EEMB 5534 and EEMB 5535 Marine Invertebrate Zoology and Botany and Lab for EEMB 5534
EEMB 5536 Ocean and Coastal Sustainability
Substitutions may be made with approval of graduate committee.

Dissertation
Code Title Hours
Complete the following (repeatable) course twice:
EEMB 9990 Dissertation

Program Credit/GPA Requirements
30 total semester hours required
Minimum 3.000 GPA required