

# Marine Biology, BS

Our Bachelor of Science in Marine Biology aims to provide students with a solid foundation in marine biology, with flexibility to explore ocean and coastal processes, marine biogeochemistry, the ecology and evolution of marine organisms, and the ocean's role and responses in global change. Core, skills-based courses are designed to prepare students for in-depth examination of the contemporary issues facing marine organisms and ecosystems, while helping to develop resumés that are strengthened by experiential learning. This major also provides options for students following a prevet or premed track.

Faculty teaching the courses are experts who are dedicated to marine research and experiential learning, providing students the opportunities to learn new, valuable skills and to expand their professional science network. Students may actively participate in field and lab work, internships at Northeastern University's Marine Science Center in Nahant, MA, study abroad through Dialogue of Civilizations programs or the long-standing Three Seas Program (see below). Additional opportunities exist for students in this strong, interdisciplinary program that prepares students for direct entry into the job market or a competitive graduate program.

**Students majoring in Marine Biology cannot be combined with majors in Biology, Ecology and Evolutionary Biology, or Environmental and Sustainability Sciences, nor can they minor in Biology, Ecology and Evolutionary Biology, or Environmental and Sustainability Sciences.**

## Three Seas Program

The Three Seas Program delivers a unique combination of inquiry-based, global study, fieldwork, and research across three distinct locations: the Gulf of Maine, tropical coastal Panama, and the Pacific Northwest. This optional, two-semester program is designed to teach students to plan and execute marine field research to enhance their future opportunities, whether in top doctoral programs or careers with government agencies or private consulting firms. Students finish the program as active scientists who are certified in scientific diving, have an expanded skill set, and have a robust professional network.

For more information, please see the Three Seas Program website (<https://cos.northeastern.edu/marine-environmental-sciences/three-seas/>).

## Program Requirements

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

## Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

## NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/nupath/>).

## Marine Biology Major Requirements

Code	Title	Hours
<b>Introduction to College</b>		
ENVR 1000 or INSC 1000	Marine and Environmental Sciences at Northeastern Science at Northeastern	1
<b>Foundations Courses</b>		
EEMB 1101 and EEMB 1102	Foundations in Ecology and Evolutionary Biology and Lab for EEMB 1101	5
EEMB 1105 and EEMB 1106	Foundations in Ecological and Evolutionary Genomics and Lab for EEMB 1105	5
<b>Genetics</b>		
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
<b>Ecology</b>		
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	5
<b>Evolution</b>		
EEMB 2400	Introduction to Evolution	4
<b>Marine Biology</b>		
EEMB 2700 and EEMB 2701	Marine Biology and Lab for EEMB 2700	5

<b>Conservation</b>		
EEMB 3460	Conservation Biology	4
<b>Scientific Communication</b>		
ENVR 4000	Science Communication and Professional Development	4
<b>Capstone</b>		
Complete one of the following:		1-4
BIOL 4701	Biology Capstone	
ENVR 4900	Earth and Environmental Science Capstone	
ENVR 4997	Senior Thesis	

## Marine Biology Options

Complete one of the following options:

- Requirements for Students (p. 3) Not Participating in Three Seas (p. 3)
- Requirements for Students (p. 3) Participating in Three Seas (p. 3)

## Supporting Courses for Marine Biology

Code	Title	Hours
<b>Mathematics</b>		
MATH 1251 or MATH 1241 or MATH 1341	Calculus and Differential Equations for Biology 1 Calculus 1 Calculus 1 for Science and Engineering	4
<b>Introduction to Data</b>		
ENVR 1500 and ENVR 1501	Introduction to Environmental, Social, and Biological Data and Lab for ENVR 1500	5
<b>Biostatistics</b>		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5
<b>Chemistry</b>		
CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161	5
CHEM 2311 and CHEM 2312 or ENVR 3410 or ENVR 4504	Organic Chemistry 1 and Lab for CHEM 2311 Environmental Geochemistry Environmental Pollution	4
<b>Physics</b>		
Complete a lecture/lab set for Physics 1:		5
<i>Physics 1</i>		
PHYS 1145 and PHYS 1146	Physics for Life Sciences 1 and Lab for PHYS 1145 (recommended)	
PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	
PHYS 1161 and PHYS 1162 and PHYS 1163	Physics 1 and Lab for PHYS 1161 and Recitation for PHYS 1161	
PHYS 1171 and PHYS 1172 and PHYS 1173	Physics 1 for Bioscience and Bioengineering and Lab for PHYS 1171 and Interactive Learning Seminar for PHYS 1171	

## Marine Biology Major Credit/GPA Requirements

Complete 89 semester hours in the major with a cumulative GPA of 2.000.

## Program Requirement

137 total semester hours required

**REQUIREMENTS FOR STUDENTS NOT PARTICIPATING IN THREE SEAS**

<b>Code</b>	<b>Title</b>	<b>Hours</b>
ENVR 3125 or ENVR 3600	Global Oceanic Change Oceanography	4
Complete five of the following:		20-24
BIOL 5587	Comparative Neurobiology	
EEMB 2290	Ecology and Evolution of Behavior	
EEMB 3001	Genetics and Evolution in Action	
EEMB 3450	Physiological Adaptations to the Environment	
EEMB 3455	Ecosystems Ecology	
EEMB 3465	Ecological and Conservation Genomics	
EEMB 3466	Disease Ecology	
EEMB 3600	Animal Behavior	
EEMB 5130	Population Dynamics	
ENVR 3125	Global Oceanic Change (If not used to fulfill another requirement of this program)	
ENVR 3201	Coastal Sustainability: Ecology and Coupled Human-Natural Systems in Southeast Asia	
ENVR 3202	Coastal Sustainability: The Blue Economy of the Gulf of Maine	
ENVR 3300 and ENVR 3301	Geographic Information Systems and Lab for ENVR 3300	
ENVR 4504	Environmental Pollution	
ENVR 4505	Wetlands	
ENVR 5220	Ecosystem-Based Management	
EEMB 5542	Marine Spatial Planning	
Elective courses available at Nahant campus:		
EEMB 5510	New England Marine Biomes	
EEMB 5522	Experimental Design Marine Ecology	
EEMB 5525	Advanced Field Methods in Marine Ecology	
EEMB 5546	Sustainability of the Land-Sea Interface	

**THREE SEAS STUDENTS**

<b>Code</b>	<b>Title</b>	<b>Hours</b>
Three Seas courses at Nahant/Northeastern campus:		
EEMB 5510	New England Marine Biomes	4
EEMB 5522 or EEMB 5525	Experimental Design Marine Ecology Advanced Field Methods in Marine Ecology	3-4
EEMB 5542	Marine Spatial Planning	4
EEMB 5546	Sustainability of the Land-Sea Interface	3
EEMB 5589	Diving Research Methods	2
Three Seas courses (abroad):		
EEMB 5504 and EEMB 5505	Biology of Corals and Lab for EEMB 5504	3
EEMB 5506 and EEMB 5507	Biology and Ecology of Fishes and Lab for EEMB 5506	3
EEMB 5508	Marine Birds and Mammals	3
EEMB 5518 and EEMB 5519	Ocean and Coastal Processes and Lab for EEMB 5518	3
EEMB 5520	Tropical Marine Ecology	2
EEMB 5538	Conservation and Restoration of Marine Systems	3
Select one of the following:		3
EEMB 5533 and EEMB 5535	Marine Invertebrate Zoology and Botany and Lab for EEMB 5533	
EEMB 5540 and EEMB 5541	Changing Global Oceans and Lab for EEMB 5540	

**Plan of Study****Four Years, Two Co-ops in Spring/Summer 1**

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
EEMB 1101 and EEMB 1102		5 CHEM 1161 and CHEM 1162 and CHEM 1163		5 Elective		4 Elective		4
ENVR 1000		1 EEMB 1105 and EEMB 1106		5 Elective		4 Elective		4
ENVR 1500 and ENVR 1501		5 PHYS 1161 and PHYS 1162 and PHYS 1163		5				
MATH 1251		4 Elective		4				
Elective		4						
		<b>19</b>		<b>19</b>		<b>8</b>		<b>8</b>
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
BIOL 2301 and BIOL 2302		5 Co-op		0 Co-op		0 Elective		4
CHEM 2311 and CHEM 2312		5				Elective		4
EESC 2000		1						
ENGW 3307		4						
ENVR 2500 and ENVR 2501		5						
		<b>20</b>		<b>0</b>		<b>0</b>		<b>8</b>
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
EEMB 2302 and EEMB 2303		5 Co-op		0 Co-op		0 Elective		4
EEMB 2400		4				Elective		4
EEMB 2700 and EEMB 2701		5						
Marine biology elective		4						
		<b>18</b>		<b>0</b>		<b>0</b>		<b>8</b>
Year 4								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
EEMB 3460		4 BIOL 4701, ENVR 4900, or ENVR 4997		1-4				
ENVR 3600 (Oceanography)		4 ENVR 3125		4				
Marine biology elective		4 ENVR 4000		4				
Marine biology elective		4 Marine biology elective		4				
		<b>16</b>		<b>13-16</b>				

Total Hours: 137-140

**Marine Biology—Three Seas Program, Four Years, One Co-op in Spring/Summer 1**

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
EEMB 1101 and EEMB 1102		5 CHEM 1161 and CHEM 1162		5 Vacation		0 Elective		4
ENVR 1000		1 EEMB 1105 and EEMB 1106		5		Elective		4
ENVR 1500 and ENVR 1501		5 EEMB 2400		4				

MATH 1251	4	PHYS 1161 and PHYS 1162 and PHYS 1163	5					
Elective	4							
	<b>19</b>		<b>19</b>		<b>0</b>			<b>8</b>

**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOL 2301 and BIOL 2302	5	Co-op	0	Co-op	0	Elective	4
CHEM 2311 and CHEM 2312	5					Elective	4
EESC 2000	1						
ENGW 3307	4						
ENVR 2500 and ENVR 2501	5						
	<b>20</b>		<b>0</b>		<b>0</b>		<b>8</b>

**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EEMB 2302 and EEMB 2303	5	Elective	4	Vacation	0	EEMB 5525	3
EEMB 2700 and EEMB 2701	5	Elective	4			EEMB 5546	3
EEMB 3460	4	Elective	4				
Elective	4	Elective	4				
	<b>18</b>		<b>16</b>		<b>0</b>		<b>6</b>

**Year 4**

Fall	Hours	Spring	Hours
EEMB 5504 and EEMB 5505	3	BIOL 4701, ENVR 4900, or ENVR 4997	1-4
EEMB 5506 and EEMB 5507	3	ENVR 4000	4
EEMB 5508	3	Elective	4
EEMB 5518 and EEMB 5519	3	Elective	4
EEMB 5520	2		
EEMB 5538	3		
EEMB 5540 and EEMB 5541	3		
	<b>20</b>		<b>13-16</b>

**Total Hours: 147-150**