Marine Biology (BA/BS)

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What if your classrooms were tidepools and mudflats? Situated on 130 acres of coastal property along Coos Bay, the Oregon Institute of Marine Biology (OIMB) is a vast, living classroom where students in biology, marine biology, general science, and environmental science study marine organisms in their natural habitat.

Marine biology majors study physiology, ecology, biology, chemistry, mathematics, and physics on campus in Eugene. During junior or senior year, undergraduates immerse themselves in three terms of intensive field and lab classes at OIMB covering diverse topics of marine biology, with opportunities for independent research and internships. With courses such as Invertebrate Zoology, Oceanography, Marine Birds and Mammals, and Tropical Marine Biology in Panama, it is little wonder our majors consider their time at OIMB to be the highlight of their college experience.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Understand the process and application of scientific inquiry; the ability to develop well-reasoned hypotheses and to design experiments by which to test them.
- Apply mathematical and statistical approaches to understanding biological information; an ability to interpret graphical representations of biological information.
- Have a broad-based knowledge of biology at multiple levels and in interdisciplinary contexts; competency in reading, understanding, and critically evaluating scientific information across major areas of the curriculum, from molecules to ecosystems.
- Communicate scientific ideas clearly, both orally and in writing to both general and professional audiences.
- Understand the relationship between science and modern society as well as the potential impact of scientific discovery on the future.
- Be aware of biological diversity in the marine environment and the mechanisms that shape this diversity.
- Understand the mechanisms that influence the structure and function of marine communities and ecosystems, and an appreciation for the bathymetric and biogeographic distributions of organisms in the sea.
- Be aware of both global and local environmental challenges in the marine environment.

Fundamental Concepts:

- Evolution and biological diversity: all living organisms are genetically related; the diversity of life evolved over time by processes of mutation and selection.
- Structure and function: Basic units of structure give rise to the function of all living things.
- Information flow, exchange, and storage: Properties of organisms emerge from the flow, exchange, expression, and storage of genetic information.
- Pathways and transformations of energy and matter: Biological systems grow and change by processes based on chemical transformation pathways and are governed by the laws of thermodynamics.
- Systems: Living systems are interconnected and interacting.

Marine Biology Major Requirements

Code	Title	Credits
Core Courses		
Math [1]		**8**
MATH 246	Calculus for the Biological Sciences I	
or MATH 251	Calculus I	
MATH 247	Calculus for the Biological Sciences II	
or MATH 252	Calculus II	
General Chemistry		**18**
CH 221	General Chemistry I	
& CH 222	and General Chemistry II	
& CH 223	and General Chemistry III	
or CH 224H	Advanced General Chemistry I	
& CH 225H	and Advanced General Chemistry II	
& CH 226H	and Advanced General Chemistry III	
CH 227	General Chemistry Laboratory	
& CH 228	and General Chemistry Laboratory	
& CH 229	and General Chemistry Laboratory	
or CH 237	Advanced General Chemistry Laboratory	
& CH 238	and Advanced General Chemistry Laboratory	
& CH 239	and Advanced General Chemistry Laboratory	
Organic Chemistry		**8**
CH 331	Organic Chemistry I	
Physics		**8**
PHYS 201	General Physics	
& PHYS 202	and General Physics	
or PHYS 251	Foundations of Physics I	
& PHYS 252	and Foundations of Physics I	
Lower-Division Biology		**15-20**
BI 211	General Biology I: Cells	
& BI 212	and General Biology II: Organisms	
& BI 213	and General Biology III: Ecology and Evolution	
& BI 214	and General Biology IV: Biochemistry and Genetics	
or BI 281H	Honors Biology I: Cells, Biochemistry and Physiology	
& BI 282H	and Honors Biology II: Genetics and Molecular Biology	
& BI 283H	and Honors Biology III: Evolution, Diversity and Ecology	
Upper-Division Biology [2]		**44**
At least one course needs to be completed from each area (I, II, and III)		
Area I: 300-level molecular, cellular, and developmental biology course		
Area II: 300-level systems and organisms course		
Area III: 300-level ecology and evolution course		
Three terms of full-time enrollment in courses at OIMB (at least 12 credits) [3]		
12 credits of courses numbered BI 420–499		

One course in modeling, analysis, programming, and statistics (MAPS) [4]	
Total Credits	**101-106**

1. A course in statistics is required if an ecology and evolution or neuroscience and behavior emphasis area is selected.
2. Students must complete a minimum of 44 upper-division biology credits. For a complete list of approved courses and other details about upper-division requirements, see the online requirements for the marine biology major (https://biology.uoregon.edu/undergraduate-program/requirements/).
3. Courses at the Oregon Institute of Marine Biology (OIMB) are offered summer session, fall, and spring terms. See oimb.uoregon.edu (http://oimb.uoregon.edu) for details of OIMB courses.
4. Visit the Biology Advising Center for a list of approved courses.

Students are required to spend three terms completing upper-division course work (taking at least 12 credits per term) at the Oregon Institute of Marine Biology. A program plan for the marine biology major is available in the Biology Advising Center, on the OIMB website, or Tykeson College and Career Advising.

Area I Courses

Code	Title	Credits
BI 320	Molecular Genetics	4
BI 322	Cell Biology	4
BI 326	Immunology and Infectious Disease	4
BI 328	Developmental Biology	4
BI 360	Neurobiology	4
BI 457	Marine Biology: [Topic]	1-8

Area II Courses

Code	Title	Credits
BI 330 & BI 331	Microbiology and Microbiology Laboratory [1]	6
BI 353	Sensory Physiology	4
BI 356	Animal Physiology	5
BI 358	Investigations in Medical Physiology	4
BI 359	Plant Biology	4
BI 451	Invertebrate Zoology	1-8

1. Both BI 330 and BI 331 must be taken to satisfy the Area II requirement.

Area III Courses

Code	Title	Credits
BI 357	Marine Biology	4
BI 370	Ecology	5
BI 374	Conservation Biology	4
BI 380	Evolution	4
BI 390	Animal Behavior	4
BI 395	Tropical Ecology	4
BI 474	Marine Ecology	1-8

Modeling, Analysis, Programming, and Statistics (MAPS) Courses

Code	Title	Credits
BI 471	Population Ecology	4
BI 485		4
ANTH 470	Statistical Analysis of Biological Anthropology	4
ERTH 418	Earth and Environmental Data Analysis	4
MATH 425	Statistical Methods I	4

Animal Use in Teaching Laboratories

Students should be aware that the biology and marine biology majors require courses in which a variety of organisms, including vertebrate animals, are used in laboratory dissections and experiments.

Prospective majors who are concerned about this should discuss it with their advisors before beginning either program. Students are encouraged to review the syllabuses for laboratory courses before enrolling. Syllabuses are available on the department's website.

Department and university policies require that the use of live vertebrate animals be minimized in teaching laboratories and be approved by the curriculum committee of the Department of Biology and by the Institutional Animal Care and Use Committee of the University of Oregon. Students who have ethical objections to animal use in a course that requires it should consult the instructor of record before enrolling.

Oregon Institute of Marine Biology

Located in Charleston on Coos Bay, the Oregon Institute of Marine Biology (OIMB), in conjunction with the biology department, offers an undergraduate marine biology major and a coordinated program of study for undergraduates in biology, general science, and environmental science or environmental studies. During fall and spring terms and the summer session, 300- and 400-level courses take advantage of the institute's unique coastal setting. Typical offerings include the following:

Code	Title	Credits
BI 322	Cell Biology	4
BI 390	Animal Behavior	4
BI 451	Invertebrate Zoology	8
BI 454	Estuarine Biology	5
BI 455	Marine Birds and Mammals	1-6
BI 457	Marine Biology: [Topic] (Biology of Fishes, Comparative Embryology and Larval Biology, Marine Conservation Biology, Molecular Marine Biology, Subtidal and Deep Sea Ecology)	4-5
BI 458	Biological Oceanography	5
BI 474	Marine Ecology	1-8

A seminar series, Seminar: [Topic] (BI 407), features weekly invited speakers who are active researchers in the marine sciences. Undergraduate research is encouraged.

The summer program offers additional 400-level courses emphasizing field studies and includes a variety of eight- and two-week courses as well as weekend workshops. Information and applications are available

from the Biology Advising Center, from the director of the institute, or from the OIMB website (https://oimb.uoregon.edu).

Malheur Field Station

The University of Oregon is a member of the Malheur Field Station consortium. Located in southeastern Oregon in the heart of the Great Basin desert, the field station provides an excellent opportunity for students to study terrestrial and aquatic systems. Credits earned in courses at the field station may be transferred to the university and are included in the total credits required for a University of Oregon degree. Courses that have been preapproved by the department may be counted for the biology major. Detailed course information and applications may be obtained from the field station website.

Honors Program in Marine Biology

To graduate with honors in marine biology, students must meet the following requirements:

1. Completion of all the requirements for the major in marine biology
2. A minimum cumulative GPA of 3.30 for all upper-division biology courses required for the major
3. Biology courses used to satisfy the marine biology degree requirements must be taken for letter grades
4. Registration for the honors program before research begins. This requires approval of the honors thesis topic by the faculty sponsor and the selection of a second member of the marine biology faculty to serve on the thesis approval committee
5. A minimum of 4 credits of research over at least three terms of research. One of these terms can be accomplished on the main campus while the thesis is being written. That term may, however, require periodic visits to the Oregon Institute of Marine Biology (OIMB)
6. Completion of a thesis, based on laboratory and/or field research that is approved by the OIMB faculty advisor and one other member of the OIMB faculty. Included at the front of the thesis should be a title page and the thesis defense committee approval. A final copy of the thesis is to be submitted to the OIMB library
7. A public defense of the thesis at OIMB

Students in residence on the main campus while enrolled in the marine biology honors program should consider enrolling in Thesis (BI 403). Contact the instructor of record for information on this course.

Four-Year Degree Plan

The degree plan shown is only a sample of how students may complete their degrees in four years. There are alternative ways. Students should consult their advisor to determine the best path for them.

Bachelor of Arts in Marine Biology

Course	Title	Credits Milestones
First Year		
Fall		
CH 221	General Chemistry I	4
CH 227	General Chemistry Laboratory	2
MATH 112Z	Precalculus II: Trigonometry	4
WR 121Z	Composition I	4
PE or seminar elective		1
	Credits	**15**
Winter		
CH 222	General Chemistry II	4
CH 228	General Chemistry Laboratory	2
MATH 246 or MATH 251	Calculus for the Biological Sciences I (Math 246 recommended) or Calculus I	4
WR 123 or WR 122Z	College Composition III (WR 123 recommended) or Composition II	4
PE or seminar elective		
	Credits	**14**
Spring		
CH 223	General Chemistry III	4
CH 229	General Chemistry Laboratory	2
MATH 247 or MATH 252	Calculus for the Biological Sciences II (Math 247 recommended) or Calculus II	4
General education course in arts and letters or social science		4
PE or seminar elective		1
	Credits	**15**
	Total Credits	**44**

Course	Title	Credits Milestones
Second Year		
Fall		
BI 211 or BI 281H	General Biology I: Cells or Honors Biology I: Cells, Biochemistry and Physiology	5
CH 331	Organic Chemistry I	4
General education course in arts and letters or social studies		4
General education or minor requirement		4
	Credits	**17**
Winter		
BI 212 or BI 282H	General Biology II: Organisms or Honors Biology II: Genetics and Molecular Biology	5
General education course in arts and letters or social studies		4
Elective or general education course that also satisfies a multicultural requirement		4
Elective or general education course.		4
	Credits	**17**
Spring		
BI 213 or BI 214 or BI 283H	General Biology III: Ecology and Evolution (If take BI 213 or BI 283H may attend OIMB the following summer) or General Biology IV: Biochemistry and Genetics or Honors Biology III: Evolution, Diversity and Ecology	5
General education courses in arts and letters or social science		8

Elective or general education course that also satisfies a multicultural requirement		4
	Credits	**17**
Summer		
PHYS 201 & PHYS 202	General Physics and General Physics	8
Elective Course		4
	Credits	**12**
	Total Credits	**63**

Course	Title	Credits	Milestones
Third Year			
Fall			
BI 214 or BI 213	General Biology IV: Biochemistry and Genetics or General Biology III: Ecology and Evolution	5	
Upper-division course with BI subject code		4	
General education course in arts and letters or social science		4	
	Credits	**13**	
Winter			
Upper-division course with BI subject code		8	
General-education course in arts and letters or social science		4	
	Credits	**12**	
Spring			
OIMB or upper-division biology course		4	
OIMB or general education course in arts and letters or social science		4	
OIMB or elective course or MAPS		4	
	Credits	**12**	
Summer			
Modeling, analysis, programming, and statistics course at Oregon Institute of Marine Biology or in an approved outside department		4	
Upper-division 400-level course at Oregon Institute of Marine Biology		2-6	
Course in BI 420-499 range at Oregon Institute of Marine Biology		6-8	
	Credits	**12-18**	
	Total Credits	**49-55**	

Course	Title	Credits	Milestones
Fourth Year			
Fall			
Oregon Institute of Marine Biology, BI 214, or upper-division biology course		4	
Oregon Institute of Marine Biology or upper-division biology course		4	
Oregon Institute of Marine Biology or elective course		4	
Oregon Institute of Marine Biology or general education course in arts and letters or social science		4	
	Credits	**16**	
Winter			
Upper-division biology course or general-education elective course		4	
BI 401, BI 402, BI 403, or BI 409 at Oregon Institute of Marine Biology		3-5	
Elective courses or courses in modelling, analysis, programming, and statistics, if needed		8	
	Credits	**15-17**	
	Total Credits	**31-33**	

Bachelor of Science in Marine Biology

Course	Title	Credits	Milestones
First Year			
Fall			
CH 221	General Chemistry I	4	
CH 227	General Chemistry Laboratory	2	
MATH 112Z	Precalculus II: Trigonometry	4	
WR 121Z	Composition I	4	
PE or seminar elective		1	
	Credits	**15**	
Winter			
BI 211	General Biology I: Cells	5	
CH 222	General Chemistry II	4	
CH 228	General Chemistry Laboratory	2	
MATH 246 or MATH 251	Calculus for the Biological Sciences I or Calculus I	4	
PE or seminar elective		1	
	Credits	**16**	
Spring			
WR 123 or WR 122Z	College Composition III (WR 123 recommended) or Composition II	4	
BI 212	General Biology II: Organisms	5	
CH 223	General Chemistry III	4	
CH 229	General Chemistry Laboratory	2	
PE or seminar elective		1	
	Credits	**16**	
	Total Credits	**47**	

Course	Title	Credits	Milestones
Second Year			
Fall			
BI 213 or BI 214	General Biology III: Ecology and Evolution or General Biology IV: Biochemistry and Genetics	5	
MATH 247 or MATH 252	Calculus for the Biological Sciences II (Math 247 recommended) or Calculus II	4	
CH 331	Organic Chemistry I	4	
General-education course in arts and letters		4	
	Credits	**17**	

Winter		
Upper-division biology course from Area II course list [1]		4
General education course in arts and letters		4
General-education course in social science that also satisfies a multicultural requirement		4
Elective course		4
	Credits	**16**
Spring		
BI 214 or BI 213	General Biology IV: Biochemistry and Genetics or General Biology III: Ecology and Evolution	5
Upper-division biology course		
Upper-division biology course from Area I or III course list		8
General-education course in arts and letters that also satisfies a multicultural requirement		4
	Credits	**17**
Summer		
Upper-division biology courses at Oregon Institute of Marine Biology		12
	Credits	**12**
	Total Credits	**62**

Course	Title	Credits Milestones
Third Year		
Fall		
PHYS 201	General Physics	4
Upper-division biology course from Area I or III course list [1]		4
General education courses in social science		8
	Credits	**16**
Winter		
PHYS 202	General Physics	4
Upper-division 300-level biology courses or numbered 420–499		8
General-education course in arts and letters		4
	Credits	**16**
Spring		
Upper-division 300-level biology courses or numbered 420–499		8
General-education course in social science		4
Elective course		4
	Credits	**16**
Summer		
Modelling, analysis, programming, and statistics course at Oregon Institute of Marine Biology or in an approved outside department		4
Upper-division 400-level course at Oregon Institute of Marine Biology		2-6
Course in BI 420–499 range at Oregon Institute of Marine Biology		6-8
	Credits	**12-18**
	Total Credits	**60-66**

Course	Title	Credits Milestones
Fourth Year		
Fall		
Course in BI 420–499 range or BI 401, 402, 403, or other 400-level course at Oregon Institute of Marine Biology		4-5
Course in BI 420–499 range at Oregon Institute of Marine Biology		10
	Credits	**14-15**
Winter		
BI 401, BI 402, BI 403, or BI 409 taken at Oregon Institute of Marine Biology		4-5
Elective courses taken on UO main campus		8-10
	Credits	**12-15**
Spring		
BI 401, 402, 403, or other 400-level course at Oregon Institute of Marine Biology		2-4
Course in BI 420–499 range at Oregon Institute of Marine Biology		11-13
	Credits	**12-17**
	Total Credits	**38-47**

[1] Marine biology course lists for Areas I, II, and III may be found online (https://oimb.uoregon.edu/academics/marine-biology-major/requirements-for-the-marine-biology-major/).