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

Courses used to fulfill the major requirements must be passed with a grade of Pass or C- or better.

Code	Title	Credits
Core Courses		
Math [1]		**8**
MATH 246	Calculus for the Biological Sciences I	
or MATH 251Z	Differential Calculus	
MATH 247	Calculus for the Biological Sciences II	
or MATH 252	Integral Calculus	
General Chemistry		**18**
CH 221Z	General Chemistry I	
or CH 224H	Advanced General Chemistry I	
CH 222Z	General Chemistry II	
or CH 225H	Advanced General Chemistry II	
CH 223Z	General Chemistry III	
or CH 226H	Advanced General Chemistry III	
CH 227Z & CH 217	General Chemistry I Laboratory and Chemistry Tools I [2]	
CH 228Z & CH 218	General Chemistry II Laboratory and Chemistry Tools II [2]	
CH 229Z & CH 219	General Chemistry III Laboratory and Chemistry Tools III [2]	
Organic Chemistry		**4**
CH 331	Organic Chemistry I	
Physics		**8**
PHYS 201 & PHYS 202	General Physics and General Physics	
or PHYS 251 & PHYS 252	Foundations of Physics I and Foundations of Physics I	
or PHYS 251 & PHYS 202	Foundations of Physics I and General Physics	
Lower-Division Biology		**18-20**
BI 221Z & BI 222Z & BI 223Z & BI 214	Principles of Biology I: Cells and Principles of Biology II: Organisms and Principles of Biology III: Ecology and Evolution and General Biology IV: Biochemistry and Genetics	
or BI 281H & BI 282H & BI 283H	Accelerated Biology I: Cells, Biochemistry and Physiology and Accelerated Biology II: Genetics and Molecular Biology and Accelerated Biology III: Evolution, Diversity and Ecology	
Upper-Division Biology [3]		**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) [4]	
12 credits of courses numbered BI 420–499	
One course in modeling, analysis, programming, and statistics (MAPS) [4]	
Total Credits	**100-102**

[1] A course in statistics is required if an ecology and evolution or neuroscience and behavior emphasis area is selected.

[2] Students who transfer CH 227Z/228Z/229Z credits from other schools may have the corresponding CH 217/218/219 course and credit requirements waived.

[3] 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/).

[4] 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.

[5] 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

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		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 221Z	General Chemistry I	4	
CH 227Z & CH 217	General Chemistry I Laboratory and Chemistry Tools I	2	
MATH 112Z	Precalculus II: Trigonometry	4	
WR 121Z	Composition I	4	
PE or seminar elective		1	
	Credits	**15**	
Winter			
CH 222Z	General Chemistry II	4	
CH 228Z & CH 218	General Chemistry II Laboratory and Chemistry Tools II	2	
MATH 246 or MATH 251Z	Calculus for the Biological Sciences I (Math 246 recommended) or Differential Calculus	4	
WR 123 or WR 122Z	College Composition III (WR 123 recommended) or Composition II	4	
PE or seminar elective		1	
	Credits	**15**	
Spring			
CH 223Z	General Chemistry III	4	
CH 229Z & CH 219	General Chemistry III Laboratory and Chemistry Tools III	2	
MATH 247 or MATH 252Z	Calculus for the Biological Sciences II (Math 247 recommended) or Integral Calculus	4	
Core-education course in arts and letters or social science		4	
PE or seminar elective		1	
	Credits	**15**	
Second Year			
Fall			
BI 221Z or BI 281H	Principles of Biology I: Cells or Accelerated Biology I: Cells, Biochemistry and Physiology	5	
CH 331	Organic Chemistry I	4	
Core-education course in arts and letters or social science		4	
Core-education course or minor requirement		4	
	Credits	**17**	
Winter			
BI 222Z or BI 282H	Principles of Biology II: Organisms or Accelerated Biology II: Genetics and Molecular Biology	5	
Core-education course in arts and letters or social science		4	
Elective or core-education course that also satisfies a cultural literacy requirement		4	
Elective or core-education course		4	
	Credits	**17**	

Spring		
BI 223Z or BI 214 or BI 283H	Principles of Biology III: Ecology and Evolution or General Biology IV: Biochemistry and Genetics or Accelerated Biology III: Evolution, Diversity and Ecology	5
Core-education course in arts and letters or social science		8
Elective or core-education course that also satisfies a cultural literacy requirement		4
	Credits	**17**
Summer		
PHYS 201 & PHYS 202	General Physics and General Physics	8
Elective course		4
	Credits	**12**
Third Year		
Fall		
BI 214 or BI 223Z	General Biology IV: Biochemistry and Genetics or Principles of Biology III: Ecology and Evolution	5
Upper-division course with BI subject code		4
Core-education course in arts and letters or social science		4
	Credits	**13**
Winter		
Upper-division course with BI subject code		8
Core-education course in arts and letters or social science		4
	Credits	**12**
Spring		
OIMB or upper-division course		4
OIMB or core-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**
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 core-education course in arts and letters or social science		4
	Credits	**16**
Winter		
Upper-division Biology course or core-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 modeling, analysis, programming, and statistics, if needed		8
	Credits	**15-17**
	Total Credits	**188-196**

Bachelor of Science in Marine Biology

Course	Title	Credits Milestones
First Year		
Fall		
CH 221Z	General Chemistry I	4
CH 227Z & CH 217	General Chemistry I Laboratory and Chemistry Tools I	2
MATH 112Z	Precalculus II: Trigonometry	4
WR 121Z	Composition I	4
PE or seminar elective		1
	Credits	**15**
Winter		
BI 221Z	Principles of Biology I: Cells	5
CH 222Z	General Chemistry II	4
CH 228Z & CH 218	General Chemistry II Laboratory and Chemistry Tools II	2
MATH 246 or MATH 251Z	Calculus for the Biological Sciences I or Differential Calculus	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 222Z	Principles of Biology II: Organisms	5
CH 223Z	General Chemistry III	4
CH 229Z & CH 219	General Chemistry III Laboratory and Chemistry Tools III	2
PE or seminar elective		1
	Credits	**16**
Second Year		
Fall		
BI 223Z or BI 214	Principles of Biology III: Ecology and Evolution or General Biology IV: Biochemistry and Genetics	5
MATH 247 or MATH 252Z	Calculus for the Biological Sciences II or Integral Calculus	4
CH 331	Organic Chemistry I	4

Core-education course in arts and letters		4
	Credits	**17**
Winter		
Upper-division Biology course from Area II course list [1]		4
Core-education course in arts and letters		4
Core-education course in social science that also satisfies a cultural literacy requirement		4
Elective course		4
	Credits	**16**
Spring		
BI 214 or BI 223Z	General Biology IV: Biochemistry and Genetics or Principles of Biology III: Ecology and Evolution	5
Upper-division Biology course		4
Upper-division Biology course from Area I or III course list		4
Core-education course in arts and letters that also satisfies a cultural literacy requirement		4
	Credits	**17**
Summer		
Upper-division Biology courses at Oregon Institute of Marine Biology		12
	Credits	**12**
Third Year		
Fall		
PHYS 201	General Physics	4
Upper-division Biology course from Area I or III course list [1]		4
Core-education course in social science		8
	Credits	**16**
Winter		
PHYS 202	General Physics	4
Upper-division Biology courses or numbered 420-499		8
Core-education course in arts and letters		4
	Credits	**16**
Spring		
Upper-division Biology courses or numbered 420-499		8
Core-education course in social science		4
Elective course		4
	Credits	**16**
Summer		
Modeling, analysis, programming, and statistics course at Oregon Institute of Marine Biology or in an approved outside department		4
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**
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 campus		8-10
	Credits	**12-15**
Spring		
BI 401, 402, 403, or other 400-level course at Oregon Institute of Marine Biology		2-4
Coruse in BI 420-499 range at Oregon Institute of Marine Biology		11-13
	Credits	**13-17**
	Total Credits	**208-222**

[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/).