

MARINE & COASTAL SCIENCE, BACHELOR OF SCIENCE

College of Agricultural & Environmental Sciences

The major in Marine & Coastal Science focuses on the interdisciplinary nature of marine sciences by exposing students to core, breadth, and focus area courses in the discipline, in addition to a strong foundation of science preparatory material. The major builds upon UC Davis strengths in marine and coastal sciences, including field-based courses offered at Bodega Marine Laboratory to provide students a unique, interdisciplinary, "hands on" education. Advising is provided by the Department of Earth & Planetary Sciences for interested students.

The Program

The major begins with introductory courses in mathematics, chemistry, physics, biology, and earth sciences. These are followed by core courses in Marine Science. The major requirements provide focus and breadth, so that each student gains mastery in one area and broad exposure to many facets of Marine & Coastal Science. Focus areas are:

- Coastal Environmental Processes
- Marine Ecology & Organismal Biology
- Marine Environmental Chemistry
- Oceans & the Earth System

In this major, students will be exposed to the foundation disciplines within marine science (biology, chemistry, geology, physics) as well as modern issues facing marine and coastal environments; e.g., climate change, pollution, carbon cycling, and conservation. The major requires field experience, independent research or internship, and concludes with a capstone course featuring current research in marine science. These integrative experiences will require students to synthesize the interdisciplinary topics that they have encountered through this degree program. The mastery achieved provides a strong foundation for future careers in academic science, government, policy, and the private sector. For more information, see Marine & Coastal Science (<https://eps.ucdavis.edu/mcs/>).

Focus Areas

The student's chosen Focus Area will determine the college into which the student is admitted, the college where the degree is awarded, and the associated department:

- **Coastal Environmental Processes.** College of Agricultural & Environmental Sciences; Environmental Science & Policy
- **Marine Ecology & Organismal Biology.** College of Biological Sciences; Evolution & Ecology
- **Marine Environmental Chemistry.** College of Agricultural & Environmental Sciences; Environmental Toxicology
- **Oceans & the Earth System.** College of Letters & Science; Earth & Planetary Sciences

Undergraduate Research

The marine sciences span many departments and colleges at UC Davis, and so students have opportunities to participate in undergraduate research (<https://eps.ucdavis.edu/students/undergrad/mcsci/research/>) in many disciplines.

Internships & Careers

A B.S. in Marine & Coastal Science provides students with knowledge and practical experience needed to pursue careers (<https://eps.ucdavis.edu/students/undergrad/mcsci/careers/>) in marine science (government, private sector, research). The major program includes research and internship experiences as well as field experience to help prepare students for these career paths.

Advising

Visit the staff major advisor (<https://eps.ucdavis.edu/students/undergrad/advising/>) for help navigating major requirements and planning for your degree. Visit the faculty major advisors (<https://eps.ucdavis.edu/students/undergrad/advising/>) for additional advice on courses, careers, and graduate school. Faculty advisors: Tessa Hill (College of Letters & Science), Anne Todgham (College of Agricultural & Environmental Sciences), Rachael Bay (College of Biological Sciences).

Visit your college's advisors for help navigating University Degree Requirements and College Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/>).

Bodega Marine Laboratory

Students in the Marine & Coastal Science major are required to complete some of their coursework at the Bodega Marine Laboratory (<https://marinescience.ucdavis.edu/bml/about/>) on the California Coast.

Global Learning in Marine & Coastal Science

Consider studying or interning abroad through programs available through the Global Learning Hub (<https://eps.ucdavis.edu/students/undergrad/mcsci/studyabroad/>).

Get Involved

Find your community (<https://eps.ucdavis.edu/students/undergrad/mcsci/involved/>) through clubs, events, seminars, and workshops relating to marine science.

Graduation Honors

Students graduating from the College of Agricultural and Environmental Sciences or College of Biological Sciences are eligible for Departmental Honors, High Honors, or Highest Honors depending on their GPA (<https://catalog.ucdavis.edu/academic-information-policies-regulations/honors-prizes/>). This is calculated automatically and added to students' final transcripts.

Students graduating from the College of Letters & Science are eligible for Departmental Honors, depending on their GPA and whether or not they complete a Senior Thesis. Students who graduate with a GPA in the top percentages of their college (<https://catalog.ucdavis.edu/academic-information-policies-regulations/honors-prizes/>) will automatically graduate with Honors. Students who qualify for Honors at graduation may also be eligible for High Honors or Highest Honors, based upon the quality of their Senior Thesis (course number 194A-194B) or Senior Honors Thesis (course number 194HA-194HB). It is Department of Earth and Planetary Sciences policy that an "A" grade on the thesis will earn the student High Honors, and an "A" grade will earn the student Highest Honors.

Graduate Study

The coursework, research opportunities, and fieldwork requirements in the Marine & Coastal Science major help prepare students to enter

graduate programs to continue their studies and prepare for their career in the marine sciences. Students should meet with advisors and faculty to build a strong application for graduate school through additional independent research or other co-curricular involvements.

The major requirements below are in addition to meeting University Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) & College Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/>); unless otherwise noted. The minimum number of units required for the Marine & Coastal Science Bachelor of Science is 95.

Code	Title	Units	
Preparatory Subject Matter			
<i>Biological Science</i>			
BIS 002A & BIS 002B & BIS 002C	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life	15	
<i>Chemistry</i>			
Choose a series: ¹		15	
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry		
OR			
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering		
<i>Organic Chemistry</i>			
Choose a series; only required for students in the Marine Ecology & Organismal Biology focus area: ²		0-13	
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course		
OR			
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences		
OR			
CHE 128A & CHE 128B & CHE 128C & CHE 129A & CHE 129B	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory and Organic Chemistry Laboratory		
<i>Mathematics</i>			
Choose a series; students in Marine Ecology & Organismal Biology focus area must take MAT 017A-MAT 017B-MAT 017C or MAT 021A-MAT 021B. ³		8-12	
MAT 016A & MAT 016B DISCC & MAT 016C DISCC	and (Discontinued for spring 2025) **		
OR			
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine		
OR			
MAT 019A & MAT 019B & MAT 019C	Calculus for Data-Driven Applications and Calculus for Data-Driven Applications and Calculus for Data-Driven Applications		
OR			
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus		
<i>Physics</i>			
Choose a series: ⁴			12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics ⁶		
OR			
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics		
Recommended:			
EVE 012	Life in the Sea		
GEL 016 or GEL 016V	The Oceans The Oceans		
Preparatory Subject Matter Subtotal			
Depth Subject Matter			
STA 100	Applied Statistics for Biological Sciences	4	
EVE/ESP 111	Marine Environmental Issues	1	
Choose three of the following four:			
GEL 116N/ ESP 116N DISCON ^{**} or EPS 116	Oceanography (Discontinued for fall 2026)		
GEL/ESP 150A	Physical & Chemical Oceanography		
GEL 150B/ ESP 150B DISCONTINUED FOR FALL 2026 ^{**} or EPS 150B	Geological Oceanography (Discontinued for fall 2026) Biological Oceanography (GEL 150C ESP 150C DISCONTINUED FOR FALL 2026) ^{**}		
Choose two:			
ATM 120	Atmospheric Thermodynamics & Cloud Physics		7-8
ESP 100	General Ecology		
ESP 110	Principles of Environmental Science		
ETX 101	Principles of Environmental Toxicology		
EVE 100	Introduction to Evolution		
EVE 101	Introduction to Ecology		
EVE 112	Biology of Invertebrates		
HYD 103N/ EBS 103	Fluid Mechanics Fundamentals		
Marine Ecology & Organismal Biology Focus Area Only.			
BIS 101 or BIS 101V	Genes & Gene Expression Genes & Gene Expression		0-13

BIS 104	Cell Biology	WFC 102L	Field Studies in Fish Biology: Laboratory
BIS 105	Biomolecules & Metabolism	WFC 157	Coastal Ecosystems
or BIS 102 & BIS 103	Structure & Function of Biomolecules and Bioenergetics & Metabolism	Field Requirement Subtotal	0-14
Depth Subject Matter Subtotal:	22-37	Internship/Research	
Courses cannot be utilized to fulfill multiple requirements, with the exception that any Bodega Marine Laboratory course simultaneously fulfills the field requirement below and ETX 127/NUT 127 may satisfy both a course and the Research Requirement.		Choose three units:	3
Focus Area		ETX/NUT 127	Environmental Stress & Development in Marine Organisms (may satisfy both a course above and the Internship/Research Requirement.)
Complete at least four courses from one category below, totaling at least 12 units.	12	BIS 124	Coastal Marine Research
Coastal Environmental Processes; College of Agricultural & Environmental Sciences; Environmental Science & Policy (p. 3)		ESP 192	Internship
Marine Ecology & Organismal Biology; College of Biological Sciences; Evolution & Ecology (p. 4)		EVE 192	Internship
Marine Environmental Chemistry; College of Agricultural & Environmental Sciences; Environmental Toxicology (p. 4)		EVE 199	Special Study for Advanced Undergraduates
Oceans & the Earth System; College of Letters & Science; Earth & Planetary Sciences (p. 4)		GEL 192	Internship in Geology
Focus Area Requirement Subtotal	12	GEL 199	Special Study for Advanced Undergraduates (or the equivalent)
Breadth Requirement		Internship/Research Subtotal	3
Complete one course from each category below, that is not the student's chosen Focus Area, totaling at least 8 units.	8	Total Units	95-144
Coastal Environmental Processes (p. 5)		1	
Marine Ecology & Organismal Biology (p. 5)		With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units w/o lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.	
Marine Environmental Chemistry (p. 5)		2	
Oceans & the Earth System (p. 5)		With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 118A-CHE 008B; CHE 128A-CHE 128B-CHE 008B; CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.	
Breadth Requirement Subtotal	8	3	
Field Requirement		With BASC advisor approval, these combinations also satisfy the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.	
Fulfill the Field Requirement	0-14	4	
The Field Requirement provides exposure to field techniques, experimental design, and the marine environment itself. It is highly recommended that students fulfill this requirement by residence at Bodega Marine Laboratory for one or more courses. Bodega Marine Laboratory courses may simultaneously fulfill an additional requirement in categories above		Students may be able to complete their Physics requirement by blending the PHY 007 & PHY 009 series. For more details about how to do so and course placement, students will need to follow up with the PHY department. Students in the College of Biological Sciences will also need to follow up with a BASC advisor to discuss their plans.	
OR		**	
Alternatively, students may fulfill the Field Requirement by taking two of the following courses; these courses cannot fulfill multiple requirements:		Course(s) discontinued; see your advisor for course options.	
ESP 123	Introduction to Field & Laboratory Methods in Ecology	Focus Area Requirement	
ESP 151L	Limnology Laboratory	Complete at least four courses from one category below, totaling at least 12 units.	
EVE 112L	Biology of Invertebrates Laboratory	Coastal Environmental Processes	
EVE 115	Marine Ecology	Emphasis on processes and environments of the coastal zone, and the strong physical-biological connection that exists here. Courses highlight the critical terrestrial marine interface and fundamental physical processes in the coastal zone.	
GEL 109L or EPS 109	Earth History: Sediments & Strata Laboratory (Discontinued for fall 2026) **	<i>The focus area requirement can be fulfilled using:</i>	
GEL 182	Field Studies in Marine Geochemistry (Discontinued for winter 2026) **		
WFC 100	Field Methods in Wildlife, Fish, & Conservation Biology		

Code	Title	Units			
ATM 121A	Atmospheric Dynamics	4	EVE 112L	Biology of Invertebrates Laboratory	2
ATM 121B	Atmospheric Dynamics	4	EVE 114	Experimental Invertebrate Biology	3
ATM 158	Boundary-Layer Meteorology	4	EVE 115	Marine Ecology	4
ETX 102A	Environmental Fate of Toxicants	4	EVE 120	Global Change Ecology	3
ESP 152	Coastal Oceanography	3	ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10
ESP 155	Wetland Ecology	4	WFC 120	Biology & Conservation of Fishes	3
ESP 155L	Wetland Ecology Laboratory (Discontinued for winter 2026) **	3	WFC 120L	Laboratory in Biology & Conservation of Fishes	2
ESP 166	Ocean & Coastal Policy	3	WFC 121	Physiology of Fishes	4
GEL 156	Hydrogeology & Contaminant Transport (Discontinued for winter 2026) **	5	WFC 122	Population Dynamics & Estimation	4
			WFC 130	Physiological Ecology of Wildlife	4
GEL 182	Field Studies in Marine Geochemistry (Discontinued for winter 2026) **	2-8			
			**		
				Course(s) discontinued; see your advisor for course options.	
HYD 103N/EBS 103	Fluid Mechanics Fundamentals	4			
HYD 134	Aqueous Geochemistry	6			
HYD 143	Ecohydrology	4			
HYD/EBS 144	Groundwater Hydrology	4			
HYD 146	Hydrogeology & Contaminant Transport (Discontinued for winter 2026) **	5			
WFC 157	Coastal Ecosystems	4			

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HYD 134 is a 5 unit course; see your advisor (<https://lawr.ucdavis.edu/students/undergrad-programs/hydrology/>) for options.

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Course(s) discontinued; see your advisor for course options.

Marine Ecology & Organismal Biology

Focus on physiological adaptations to the marine environment, and the biology of marine species from the molecular to population levels. Courses include emphasis on the ecological processes that determine the distribution and abundance of marine organisms, and the patterns and mechanisms of evolution in the ocean.

The focus area requirement can be fulfilled using:

Code	Title	Units			
ANS 131	Reproduction & Early Development in Aquatic Animals	4			
BIS 122	Population Biology & Ecology	3			
BIS 122P	Population Biology & Ecology/Advanced Laboratory Topics	5			
BIS 124	Coastal Marine Research	6			
ESP 100	General Ecology	4			
ESP 121	Population Ecology	4			
ESP 124	Marine & Coastal Field Ecology	3			
ESP 155	Wetland Ecology (Discontinued for winter 2026) **	4			
ESP 155L	Wetland Ecology Laboratory (Discontinued for winter 2026) **	3			
EVE 100	Introduction to Evolution	4			
EVE 101	Introduction to Ecology	4			
EVE 106	Mechanical Design in Organisms (Discontinued for winter 2026) **	3			
EVE 112	Biology of Invertebrates	3			

HYD 134 is a 5 unit course; see your advisor (<https://lawr.ucdavis.edu/students/undergrad-programs/hydrology/>) for options.

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Course(s) discontinued; see your advisor for course options.

Oceans & the Earth System

A study of our changing oceans in the context of earth system history, including climate change, paleoceanography, ecological shifts, conservation, and marine policy.

The focus area requirement can be fulfilled using:

Code	Title	Units
ATM 116	Modern Climate Change	3
ESM 120	Global Environmental Interactions	4
ESM 121	Water Science & Management	3
ESP 110	Principles of Environmental Science	4
ESP 161	Environmental Law	4

ESP 162	Environmental Policy	4
ESP 166	Ocean & Coastal Policy	3
ESP 169	Water Policy & Politics	3
EVE 120	Global Change Ecology	3
GEL 107	Earth History: Paleobiology	3
GEL 107L	Earth History: Paleobiology Laboratory	2
GEL 108	Earth History: Paleoclimates	3
GEL 109	Earth History: Sediments & Strata (Discontinued for fall 2026) **	3
or EPS 109		
GEL 109L	Earth History: Sediments & Strata Laboratory (Discontinued for fall 2026) **	2
or EPS 109L		
GEL 144	Historical Ecology (Discontinued for fall 2026) **	3
or EPS 144		
SAS 120	Science & Contemporary Societal Issues	3
WFC 144	Marine Conservation Science	4
WFC 154	Conservation Biology	4

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Course(s) discontinued; see your advisor for course options.

Marine Environmental Chemistry

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
CHE 100	Environmental Water Chemistry	3
ECI 140B	Chemical Principles for Environmental Engineers	4
ETX 120	Perspectives in Aquatic Toxicology	4
ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10
GEL 182	Field Studies in Marine Geochemistry (Discontinued for winter 2026) **	2-8
HYD 134	Aqueous Geochemistry	6
HYD 141	Physical Hydrology	4

HYD 134 is a 5 unit course; see your advisor (<https://lawr.ucdavis.edu/students/undergrad-programs/hydrology/>) for options.

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Course(s) discontinued; see your advisor for course options.

Breadth Requirement

Complete one course from each category below, that is not the student's chosen Focus Area, totaling at least 8 units.

Coastal Environmental Processes

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
ATM 158	Boundary-Layer Meteorology	4
ECI 140B	Chemical Principles for Environmental Engineers	4
ESP 110	Principles of Environmental Science	4
ESP 152	Coastal Oceanography	3
ESP 155	Wetland Ecology	4
GEL 182	Field Studies in Marine Geochemistry (Discontinued)	2-8
WFC 157	Coastal Ecosystems	4

Marine Ecology & Organismal Biology

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
BIS 124	Coastal Marine Research	6
ESP 124	Marine & Coastal Field Ecology	3
ESP 155	Wetland Ecology	4
EVE 106	Mechanical Design in Organisms (Discontinued for winter 2026) **	3
EVE 114	Experimental Invertebrate Biology	3
EVE 115	Marine Ecology	4
EVE 120	Global Change Ecology	3
ETX/NUT 127	Environmental Stress & Development in Marine Organisms	10

Oceans & the Earth System

The breadth requirement can be fulfilled using the following courses:

Code	Title	Units
ATM 116	Modern Climate Change	3
ESP 166	Ocean & Coastal Policy	3
EVE 120	Global Change Ecology	3
GEL 107	Earth History: Paleobiology	3
GEL 108	Earth History: Paleoclimates	3
WFC 144	Marine Conservation Science	4
WFC 154	Conservation Biology	4

Total Units for the Major by Chosen Focus Area

Focus Area	Units
Oceans & the Earth System (Letters & Science)	95-118
Marine Ecology & Organismal Biology (Biological Sciences)	110-144
Marine Environmental Chemistry (Agricultural & Environmental Sciences)	95-118
Coastal Environmental Processes (Agricultural & Environmental Sciences)	95-118