

## Bachelor of Science

# Ocean and Earth Science with a Major in Environmental Sciences (BS)

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Students in the Ocean and Earth Science program focus on global systems that control environmental conditions on the planet. They also learn to develop solutions to complex environmental problems by working in interdisciplinary teams. All majors in the department complete courses in the basic sciences and mathematics and core courses in Earth systems science. Students majoring in Biological Oceanography, Chemical Oceanography, Physical Oceanography, and Geology complete a capstone field research experience. In addition, students complete a suite of specialty courses specified in each major. A minimum grade of C or higher in all major and prerequisite courses is required for graduation.

## Ocean and Earth Science with a Major in Environmental Sciences

The environmental sciences major is designed for students broadly interested in earth and ocean sciences. Students in this major gain a solid background in basic sciences (e.g., chemistry, physics, math, and biology) while also taking courses in geology, oceanography, and atmospheric sciences. The major is also designed to allow students the freedom to focus their upper-level coursework in a disciplinary field in ocean and earth sciences they find most compelling. Students in this major will be prepared for a wide range of future scientific pursuits (including graduate studies in appropriate fields), as well as work (or graduate studies) that applies their skills to policy development and interpretation. Specific employment opportunities include work in local, state, and federal government agencies, environmental consulting firms, and non-governmental organizations (NGOs).

## Requirements

### Lower-Division General Education

Written Communication ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written</a> )	6
Oral Communication ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral</a> )	3
Mathematics ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math</a> )	3
Language and Culture ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language</a> )	0-6
Information Literacy and Research ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information</a> )	3
Human Behavior ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior</a> )	3
Human Creativity ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity</a> )	3
Interpreting the Past ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret</a> )	3
Literature ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature</a> )	3
Philosophy and Ethics ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy</a> )	3
The Nature of Science ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature</a> )	8

Impact of Technology (<http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact>) 3

Written Communication: grade of C or better required in both courses

Oral Communication: met in the major by OEAS 444.

Mathematics: MATH 211 or MATH 205

Information Literacy and Research: met in the major by OEAS 130G

The Nature of Science: CHEM 121N & CHEM 122N, CHEM 123N & CHEM 124N

Impact of Technology: met in the major by OEAS 220T

## Upper-Division General Education

- Option A. Approved Disciplinary Minor (a minimum of 12 hours determined by the department), or second degree or second major.
- Option B: Interdisciplinary Minor (specifically 12 hours, 3 of which may be in the major)
- Option C. An approved Certification Program such as teaching licensure
- Option D. Two Upper-Division Courses from outside the College of Sciences and not required by the major (6 hours)

## Requirements for Graduation

Requirements for graduation include the following:

- Minimum of 120 credit hours.
- Minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward the major.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward a minor.
- Completion of ENGL 110C, ENGL 211C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better. The W course must be taken at Old Dominion University.
- Completion of Senior Assessment.

## Environmental Sciences Major

### General Education

Complete lower-division requirements 32-39

Complete upper-division requirements (minimum of 6 credit hours) 6

### Environmental Sciences

OEAS 111N	Physical Geology	4
OEAS 130G	Research Skills and Information Literacy for the Natural Sciences	3
BIOL 121N & BIOL 122N	General Biology I and General Biology I Lab	4
BIOL 123N & BIOL 124N	General Biology II and General Biology II Lab	4
PHYS 111N or PHYS 231N	Introductory General Physics University Physics I	4
PHYS 112N or PHYS 232N	Introductory General Physics University Physics II	4
OEAS 220T	Introduction to Meteorology	3
BIOL 291 or OEAS 320	Ecology Sedimentology and Stratigraphy	3
STAT 310	Introductory Data Analysis	3
OEAS 306	Oceanography	3
OEAS 307	Oceanography Laboratory	1
OEAS 310	Global Earth Systems	4

OEAS 406	Matlab	1
OEAS 444	Communicating Ocean Science to Informal Audiences (meets Oral Communication)	3
GEOG 402	Geographic Information Systems	3
Upper-Division Electives (all 300-400 Level OEAS courses) *		19

Select courses from the list below for a total of 19 credits hours

OEAS 250N	Natural Hazards and Disasters (L)	
OEAS 303	Paleontology (L)	
OEAS 315	Minerals and Rocks (L)	
OEAS 320	Sedimentology and Stratigraphy (L; can be used as an elective only if not taken as required course above)	
OEAS 344W	Geomorphology	
OEAS 350	Where Rivers Meet the Sea: Ecology and Climate	
OEAS 403W	Aquatic Pollution	
OEAS 405	Physical Oceanography	
OEAS 410	Chemical Oceanography	
OEAS 412	Global Environmental Change	
OEAS 413	Environmental Geochemistry	
OEAS 415	Waves and Tides	
OEAS 416	Electronics and Oceanographic Instrumentation	
OEAS 418	Limnology: Biogeochemistry of Lakes	
OEAS 419	Spatial Analysis of Coastal Environments	
OEAS 420	Hydrogeology (L)	
OEAS 425	Marine Geology	
OEAS 430	Introduction to Geophysics	
OEAS 434	Geodynamics	
OEAS 440	Biological Oceanography (L)	
OEAS 452	Microbial Ecology of the Oceans (L)	
OEAS 453W	Marine Molecular Ecology (L)	
OEAS 466W	Introduction to Mitigation and Adaptation Studies	
OEAS 467	Sustainability Leadership	
OEAS 468W	Research Methods in Math and Sciences	
OEAS 490	Paleoceanography	

**Total Credit Hours 104-111**

\* For these upper-division courses please pay careful attention to prerequisites that may not necessarily also be required courses in the major. A minimum of two courses must have a structured laboratory or field requirement (indicated by L). Up to 4 credits of 200-level courses may be used to satisfy this upper-division requirement. Up to six credit hours of electives from departments outside of Ocean and Earth Sciences on an approved electives list can be used to satisfy this requirement (see the Chief Departmental Advisor for details). At least one writing-intensive "W" course must be taken within the major.

### Elective Credit

Elective credit may be needed to meet the minimum requirement of 120 credit hours.

## Honors Program in Ocean and Earth Science

Students admitted by the faculty to the Ocean and Earth science honors program engage in supervised individual study in areas of their interest. Honors students must complete all courses required by the department with

a minimum grade point average of 3.50 and a total of at least three credits in one of the following courses:

OEAS 487	Honors Research in Ocean and Earth Sciences	1-3
OEAS 497	Special Problems and Research	1-3

## Degree Program Guide

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

Course	Title	Credit Hours
<b>Freshman</b>		
<b>Fall</b>		
ENGL 110C	English Composition	3
OEAS 111N	Physical Geology	4
BIOL 121N and BIOL 122N		4
	Elective or Language and Culture (may be waived; see requirements for details)	3
Literature		3
<b>Credit Hours</b>		<b>17</b>
<b>Spring</b>		
MATH 205 or MATH 211	Calculus for Life Sciences or Calculus I	3-4
ENGL 211C or ENGL 231C	Writing, Rhetoric, and Research or Writing, Rhetoric, and Research: Special Topics	3
Interpreting the Past		3
BIOL 123N and BIOL 124N		4
	Elective or Language and Culture (may be waived; see requirements for details)	3
<b>Credit Hours</b>		<b>16-17</b>
<b>Sophomore</b>		
<b>Fall</b>		
CHEM 121N and CHEM 122N		4
OEAS 130G	Research Skills and Information Literacy for the Natural Sciences (Meets Information Literacy and Research)	3
OEAS 320 or BIOL 291	Sedimentology and Stratigraphy or Ecology	4
PHYS 111N or PHYS 231N	Introductory General Physics or University Physics I	4
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
CHEM 123N and CHEM 124N		4
OEAS 220T	Introduction to Meteorology (Meets Impact of Technology))	3
Philosophy and Ethics		3
PHYS 112N or PHYS 232N	Introductory General Physics or University Physics II	4
<b>Credit Hours</b>		<b>14</b>

<b>Junior</b>		
<b>Fall</b>		
OEAS 306	Oceanography	3
OEAS 300/400-level elective		3
Human Behavior		3
Elective		3
<b>Credit Hours</b>		<b>12</b>
<b>Spring</b>		
OEAS 307	Oceanography Laboratory	1
OEAS 310	Global Earth Systems	4
STAT 310	Introductory Data Analysis	3
OEAS 406	Matlab	1
OEAS 300/400-level elective		3
Elective		3
<b>Credit Hours</b>		<b>15</b>
<b>Senior</b>		
<b>Fall</b>		
OEAS 300/400-level elective		3
OEAS 300/400-level elective		3
OEAS 300/400-level elective		3
Human Creativity		3
Upper-Division General Education Course (Option D)		3
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
OEAS 444	Communicating Ocean Science to Informal Audiences (Meets Oral Communication)	3
GEOG 402	Geographic Information Systems	3
OEAS 300/400-level elective		4
Upper-Division General Education Course (Option D)		3
Elective		3
<b>Credit Hours</b>		<b>16</b>
<b>Total Credit Hours</b>		<b>120-121</b>

## BA or BS to MPA (Master of Public Administration) Linked Program

The linked BA/MPA or BS/MPA program provides qualified Old Dominion University undergraduate students with the opportunity to earn a master's degree in public administration while taking credits in the MPA program as an undergraduate student. The program is designed for highly motivated students with the desire to immediately continue their education after the bachelor's degree. The program is especially relevant to individuals seeking to work (or currently working) in the public or non-profit sectors, but is suitable for students from any undergraduate major. Graduate courses may be taken during the fall and spring semester of the student's senior undergraduate year. Up to 12 graduate credits can count toward both the undergraduate and graduate degree and can meet upper-level General Education requirements. After receiving the undergraduate degree, a student will continue with the MPA program, taking MPA courses until completing the required 39 credit hours. Students in the linked program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Requirements for admission to the graduate program can be found in the School of Public Service section of the Graduate Catalog (<http://catalog.odu.edu/graduate/business/public-service/>). For additional information, please contact the School of Public Service in the Strome College of Business.

## BA or BS to MBA (Master of Business Administration) Linked Program

The linked BA/MBA or BS/MBA program is an early entry to the MBA program of study. The early-entry program is designed for well qualified non-business undergraduate ODU students to start their MBA program prior to completing their undergraduate degree. Well qualified non-business undergraduate students may take MBA-level courses as early as three semesters prior to graduation and count up to 12 graduate credits toward their undergraduate degree. Students participating in the early-entry program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree). Early-entry program students should carefully consider their undergraduate degree program requirements when planning their course of study. Students in the early-entry program work in close consultation with the MBA Program Office and should refer to information in the Strome College of Business section in the graduate catalog (<http://catalog.odu.edu/graduate/stromecollegeofbusiness/>) to develop an individualized plan of study based on the required coursework.