



STUDENT INFORMATION

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THE DEPARTMENT OF MARINE SCIENCE

Marine Science integrates the study of Biology, Chemistry, Geology, Physics and Mathematics and applies these to the estuarine, coastal, and oceanic environments. Students select courses from Marine Science, Biology, Chemistry, Computer Science, Geology, Mathematics, Statistics, or Physics. All marine science students are encouraged to select an area of emphasis in marine biology, marine or coastal ecology, marine chemistry, or physical oceanography, the study of atmosphere-ocean dynamics. Lecture, laboratory, and field experiences are integrated to provide a well-rounded scientific program. The facilities available for Marine Science students include a lecture and laboratory complex, a computer research lab, ocean-going and estuarine research vessels, and many kinds of oceanographic sampling equipment. Course lab field trips and research projects are conducted at various coastal habitats, including Waties Island, a barrier island, marsh and upland complex used by the University for teaching and research. Marine science graduates are employed as marine and environmental researchers for government agencies, universities, and private industry; as aquarists, technicians, and educators for aquariums and museums; as high school and middle school science teachers; and in the fields of marine and environmental management and policy. Outstanding students are encouraged to pursue graduate study.

MARINE SCIENCE Frequently Asked Questions

Why study Marine Science at Coastal Carolina University?

- **Our Department's core philosophy is that students benefit greatly from hands-on experience** and that this training will prove invaluable once the student has graduated and finds himself/herself competing in the job market or applying to graduate schools.
- Coastal Carolina University has the largest undergraduate Department of Marine Science on the U.S. Atlantic coast. The companion graduate programs (M.S. and Ph.D) support and provide opportunities for undergraduates pursuing in both B.S. degrees.
- Our faculty came to Coastal Carolina University because they value teaching AND research at all degree levels (B.S., M.S., Ph.D). Our teaching and research are complementary and synergistic.
- Our faculty actively encourages undergraduate student participation in research and hands-on training that incorporates modern technology in formal lecture and laboratory courses as well as for-credit student research courses. Each year many CCU Marine Science undergraduate students attend and present their research at regional, national, and/or international professional meetings with their research mentors.
- Class sizes are relatively small at all course levels.
 - Introductory lectures have no more than 60 students with 20 students in each related laboratory course section.
 - Upper level elective lecture courses usually have 30-40 students with 15-20 students in the related laboratory course.
- All of our laboratory courses are designed to provide hands-on experiential STEM learning that integrates modern technology to provide professional training applicable to entry level jobs. In a normal semester, most labs across our curriculum (100-400 levels) include at least 2-3 field trips to explore local ocean, estuary, and marsh habitats and collect related samples and quantitative data that are then processed, analyzed, and interpreted in subsequent laboratory exercises where faculty teach and apply the highest professional standards to apply the resulting data.
- Department facilities include a dedicated lecture/laboratory complex, computer research labs and research vessels. The University also has access to Waties Island, a pristine barrier island, for courses and student research. Through classes and collaborative research, students may access facilities in the other six GCOS Departments as well as the Burroughs & Chapin Center for Marine and Wetland Studies.
- Students are encouraged to pursue local and national internship opportunities through the University Career Services Office. Many of our students apply to the internship programs at local organizations including Ripley's Aquarium, Huntington Beach State Park, Myrtle Beach State Park, and other organizations across the nation.
- The Department of Marine Science usually offers Maymester travel courses for CCU students including Coral Reef Ecology held in Discovery Bay, Jamaica, Shark Biology at the Bimini Biological Field Station in the Bahamas, Biology of Sea Turtles in Costa Rica, and Field Methods in Oceanographic Data Analysis on Oban, Scotland.
- Students may choose to participate in exchange programs that provide an opportunity to spend a semester off campus at Deakin University in Australia, the University of Alaska, Homer, or many other locations worldwide

What are the differences between a B.S. in Marine Science and a B.S. in Marine Coastal Environmental Science?

Both Coastal Carolina University Department of Marine Science Bachelor's degrees are science degrees rooted in a quantitative interdisciplinary foundation. The main coursework differences between the B.S. in Marine Science (MSCI) and the B.S. in Marine Coastal Environmental Science (MCES) are:

- Students earning a MSCI degree are required to take
 - two college calculus classes and 1 statistics lecture (with lab) class
 - four 300 level lecture and lab class pairs in marine biology, marine geology, marine chemistry, and physical oceanography and
 - five lecture and lab class pairs that are upper science electives across these areas.
- Students earning a MCES degree are required to take:
 - two quantitative classes from a group including calculus, statistics, macroeconomics, and computer science
 - two 300 level lecture and lab class pairs from marine biology, marine geology, marine chemistry, and physical oceanography and
 - two lecture and lab class pairs in environmental science and
 - one 400 level field methods lecture and lab class pair focused on coastal environments (estuaries, beaches, tidal marshes) and
 - four upper level lecture and lab class pairs that are upper level science electives
 - one upper level course selected from a list of humanities and education classes focused on applied environmental topics (e.g., economics, law)

Examples of upper science electives available for both degrees include Biology of Marine Mammals, Shark Biology, Marine Invertebrate Zoology, Coastal Hazards, Environmental Chemistry, Hydrographic Techniques, and Atmospheric Science, Biology of Marine Plankton, Marine Molecular Ecology, and Introduction to GIS.

The MSCI degree addresses skills and topics related to the global ocean basins including the coastal zones. The MCES degree focuses on skills and topics directly related to the coastal land-water interface extending inland from the continental shelf break to watershed origins on the terrestrial coastal plain. Graduates from either degree track have practical experience and critical thinking skills suited to careers in habitat monitoring, resource management, and science-based decision making integrating technology with agencies, private industry, and/or universities.

What are some career options for B.S. in Marine Science (MSCI) majors?

Marine science majors are prepared for a variety of careers including technician, research, and management positions with federal, state, and local government and private industry firms working in the global ocean, estuaries; or the U.S. Great Lakes, marine science and environmental education with aquariums, secondary schools, parks, and private firms; land-use resource planning for local, state, regional, and federal agencies; and participation in eco-tourism, aquarium husbandry, or diving careers.

What are some career options for B.S. in Marine Coastal Environmental Science (MCES) majors?

Marine Coastal Environmental Science majors are prepared for a variety of careers including technician, research, and management positions with federal, state, and local government or private industry firms working in coastal shelf and inshore tidal habitats and the U.S. Great Lakes; environmental education with aquariums, secondary schools, parks, and private firms; land-use resource planning for local, state, regional, and federal agencies; participation in eco-tourism, aquarium husbandry, or diving careers as well as policy or law careers.

What minors are offered by the Department of Marine Science?

Students from across the University may earn a minor in Marine Science, Environmental Science, or Coastal Geology. Minor programs of study require. Descriptions of each minor are available from the University Catalog on the University webpages (www.coastal.edu) as well as in Appendix 1 of this handbook.

IMPORTANT ACADEMIC INFORMATION

COURSE LOAD: A typical course load is 15 – 17 hours or 5 classes per semester. To take more than 18 credit hours a semester, a student must be prepared to pay for the additional credit(s). Permission to add an overload must be requested via a special permission form.

DROPPING A COURSE: The academic calendar lists the last day a student may drop or withdraw from a course without receiving a W/F (drop with a failing grade). Students are urged to check the University Academic Calendar and/or University Catalog each semester, although many faculty include this important date on the course syllabus.

GRADES OF “D”: If you receive a “D” or below in any upper-level courses taken for major credit or in any other course in which you need a “C” or better, you are required to repeat the course (refer to section on repetition of a course) to satisfy the B.S. degree requirements and graduate.

REPEAT FORGIVENESS OF A COURSE: A student may elect to count up to 13 credits of specific courses for Repeat Forgiveness. Under this policy, the grade for both the original and the later course appear on the transcript, but only the latter grade is included in the GPA calculation. Only courses with a grade of C, D, D+, F, or WF are eligible for repeat forgiveness. *A student may not exercise the “repeat forgiveness” option for courses in which the student was assigned a grade as a result of academic misconduct. Students using the “repeat forgiveness” option should be aware that professional schools, graduate programs, and future employers may apply their own criteria that may not recognize a “repeat forgiveness” option in evaluating credentials for prospective students and employees.*

STUDENT RESEARCH PROJECTS: Marine Science students are strongly encouraged to complete a directed undergraduate research project and/or a senior thesis project under the direction of a Department of Marine Science faculty member. It is the Department's core philosophy that students benefit greatly from hands-on experience and this training will prove invaluable once the student has graduated and finds himself/herself competing in the job market or applying to graduate schools. In order to sign up for either class the student must fill out a Contract for Research Work, an Instructional/Course agreement, Non-Traditional Study form, and a Special Permission form. Once all the necessary signatures have been obtained, the student then takes the Special Permission form to the Registrar's office to be enrolled in the class. No more than six (6) hours of independent study, internship, and/or directed undergraduate research and/or senior thesis may be used for major credit.

SPECIAL ENROLLMENT REQUESTS: If a student is planning on taking any classes anywhere besides Coastal Carolina University, the student works with their Academic Advisor to fill out a **Special Enrollment Request Form** to ensure that the course will transfer back and apply toward their CCU degree.** After the student has completed the course, the student must request that a copy of the transcript for that course be sent to Coastal. Once the transcript has been sent and the Registrar's Office has been given enough time to enter the course into the student's records, then the student should request a copy of their Transfer Credit Report from the Registrar's Office to ensure that the class was transferred correctly. A student must earn a “C” or better for a course to transfer and apply to the CCU degree.

DEGREE OBJECTIVES AND REQUIREMENTS

DEGREE REQUIREMENTS FOR THE BACHELOR OF SCIENCE (B.S.) IN MARINE COASTAL ENVIRONMENTAL SCIENCE

Objectives: The B.S. in marine coastal environmental science (MCES) will provide knowledge and practical training for students to quantitatively and critically evaluate and address marine and coastal environmental topics within an interdisciplinary framework encompassing at least two marine science sub-disciplines. This degree builds on a broad quantitative natural science foundation (biology, chemistry, mathematics, physics) with focus on one marine science sub-discipline (biology, geology, chemistry, or physical oceanography). Students will integrate and apply these fundamental concepts to conservation, management, economic, and policy topics related to modern marine and coastal environments. The MCES degree will train students who are interested in marine and coastal aquatic, environmental, and/or conservation subjects and their practical quantitative application to real world scenarios for related entry level positions and/or graduate study in marine, coastal, and environmental research, management, education, planning, law, and/or policy at government agencies, universities, and private industry firms.

Students must earn a grade of C or better in all major and upper-level science courses. No more than 6 hours of research or internship credit may be applied toward the degree.

DOUBLE MAJORS

Students may double major in any CCU program which offers a bachelor's degree. To complete a double major, students must satisfy the major requirements for both programs and complete a minimum combined total of 48 upper-level credits in the two majors, all with a grade of 'C' or better. MCES students that complete a second major in MSCI may apply the eight required 300 level foundation credits in MSCI (MSCI 301/L, MSCI 302/L, MSCI 304/L, and/or MSCI 305L) and up to four additional 300 or 400 level MSCI elective credits for a maximum total of 12 shared credits between the MCES and MSCI degrees.

MINORS

Students majoring in marine coastal environmental science are not required to complete a minor or cognate. However, they may elect to minor in any field in which Coastal Carolina offers a minor. If the minor includes courses which can be used for marine and coastal environmental science major credit, then up to eight credit hours of those courses may also be applied toward the marine coastal environmental science major's upper level science requirement of 26-28 credit hours.

A suggested 4 year plan for the B.S. in Marine Coastal Environmental Science is below.

MCES Marine Coastal Environmental Science Suggested Four Year Plan (Unofficial)

Note: Students must place higher than MATH 131 or earn a C or better in MATH 131 before registering for BIOL 121/L, MSCI 111/L and MSCI 112/L.

Course Name	Credit Hours	Course Name	Credit Hours
Year 1			
Fall		Spring	
UNIV 110	3	BIOL 121/L	4
ENGL 101	3	ENGL 102	3
MSCI 111/L or MSCI 112/L	4	MSCI 112/L or MSCI 111/L	4
MATH 135, MATH 160 (A&B), or STAT 201/L	3-4	STAT 201/L, STAT 318, ECON 201, or MATH 160/1 (A&B)	3-4
Total Semester Hours	13-14	Total Semester Hours	15-16
Year 2			
Fall		Spring	
BIOL 122/L	4	Core Curriculum Class	3-4
MSCI 302/L or MSCI 304/L	4	MSCI 302/L or MSCI 304/L or MCES 422/L	4
CHEM 111/L	4	CHEM 112/L	4
Foreign Language (115)	5	ENVI 201/L	4
Total Semester Hours	17	Total Semester Hours	15-16
Year 3			
Fall		Spring	
MSCI 305/L or 311/L	4	HIST 201 or POLI 201	3
PHYS 211/L or PHYS 205/L	4	PHYS 212/L or PHYS 206/L	4
MSCI 311/L or MCES 422/L	4	MSCI 441/L or 479/L	4
Core Curriculum Class	3	ENVI 420/L	4
Total Semester Hours	15	Total Semester Hours	15
Year 4			
Fall		Spring	
MSCI 301/L or MSCI/SCI upper level	4	Required non-science elective	3
MSCI 401/L or 458/L or MCES/MSCI/SCI upper level	4	MCES/MSCI/SCI upper level	4
Core Curriculum Class	3	Core Curriculum Class	3
Core Curriculum Class	3	Elective	3
Total Semester Hours	14	Total Semester Hours	13
		Total Credit Hours	120

A grade of 'C' or better is required for all major requirements. No more than six credit hours of research or internship, credit may be used for major credit.

DEGREE REQUIREMENTS FOR THE BACHELOR OF SCIENCE (B.S.) IN MARINE SCIENCE

Objective: Students completing the B.S. in marine science (MCSI) will have an understanding of major concepts across all four marine science subdisciplines and be able to quantitatively integrate marine biology, marine chemistry, marine geology, and physical oceanography to critically evaluate and apply these skills, practical training, and related technology to coastal and oceanic marine systems. Students completing the B.S. in MSCI will be well prepared for their pursuit of advanced degrees or employment in marine-science-related fields including research, management, education, and/or policy at government agencies, universities, and private industry firms.

Students must earn a grade of C or better in all major and upper-level science courses. Students who have not earned a C or better in a Mathematics course within one year of enrollment at Coastal Carolina University are considered to be at risk for the B.S. in Marine Science. No more than 6 hours of research or internship credit may be applied toward the degree.

The complete current list of requirements for the B.S. in Marine Science major may be found in the [Coastal Carolina University Undergraduate Catalog](http://www.coastal.edu) which is available from the University website (www.coastal.edu).

DOUBLE MAJORS

Students may double major in any program which offers a B.S. degree. To complete a double major, students must satisfy the major requirements for both programs and complete a minimum combined total of 48 upper-level credits in the two majors, all with a grade of 'C' or better.

MINORS

Students majoring in marine science are not required to complete a minor or cognate. However, they may elect to minor in any field in which Coastal Carolina offers a minor. If the minor includes courses which can be used for marine science major credit, then up to eight credit hours of those courses may also be applied toward the marine science major's upper level science requirement of 36 credit hours.

A suggested 4 year plan for the B.S. in Marine Science is below.

MARINE SCIENCE SUGGESTED FOUR YEAR PLAN (Unofficial)

Note: Students must place higher than MATH 131 or earn a C or better in MATH 131 before registering for BIOL 121/L, MSCI 111/L and MSCI 112/L.

	Fall	Credits	Spring	Credits	
Year 1	UNIV 110	3	BIOL 121/L	4	
	ENGL 101	4	ENGL 102	4	
	MSCI 111/L	4	MSCI 112/L	4	
	MATH 160 (A&B)	4	MATH 161 (A&B)	4	
		15*		15	Total: 31
<i>*Advanced students may consider adding an additional 3 credit core curriculum course in their first semester to accelerate their progress.</i>					
Year 2	BIOL 122/L	4	Core Curriculum Class	3	
	MSCI 304/L	4	MSCI 302/L	4	
	CHEM 111/L	4	CHEM 112/L	4	
	Foreign Language (115)	5	STAT 201/L	4	
		17		15	Total: 63
<i>Note: Students must earn a C or better in MATH 160B before registering for PHYS 211/L.</i>					
Year 3	MSCI 305/L	4	HIST 201 or POLI 201	3	
	PHYS 211/L	4	PHYS 212/L	4	
	MSCI/SCI upper level	4	MSCI/SCI upper level	4	
	Core Curriculum Class	3	MSCI/SCI upper level	4	
		15		15	Total: 93
<i>Note: Students must earn a C or better in PHYS 212/L before registering for MSCI 301/L.</i>					
Year 4	MSCI 301/L	4	MSCI/SCI upper level	4	
	MSCI/SCI upper level	4	MSCI/SCI upper level	4	
	Core Curriculum Class	3	Core Curriculum Class	3	
	Core Curriculum Class	3	Elective	2	
		14		13	Total: 120

COASTAL AIMS PLAN

The Coastal Accelerated Integrated Marine Science (Coastal AIMS) Plan offers a comprehensive plan for highly motivated students to complete all coursework requirements for both the B.S. in Marine Science and the M.S. in Coastal Marine and Wetland Studies within five years. Highly motivated students would enroll in above-average course loads during their first three years of study, enabling them to take up to 12 graduate credits via the Transitional Study program during their fourth year.

Students applying to the AIMS Plan must maintain a minimum cumulative undergraduate GPA of 3.0, and earn an average GPA of 3.0 or better in the 300-level MSCI core courses. At the completion of at least 90 undergraduate credits, students accepted into the AIMS Plan will apply for conditional acceptance into the CMWS program. GRE scores and the application fee will be waived for this application, which will require two letters of recommendation from CCU Graduate Faculty and a written commitment from a Graduate Faculty member to serve as the student's M.S. adviser.

Full acceptance to the CMWS program will occur at the completion of the B.S. degree requirements and fulfillment of the above-listed academic standards. In addition to offering an expedited pathway to both the B.S. and M.S. degrees, students in the AIMS Plan may earn waivers for up to two graduate core courses. For more information, contact the Department of Marine Science.

STUDENT CLUBS & ORGANIZATIONS

Students may participate in clubs and organizations on campus. Clubs are a great way for new students to meet and make friends, and for continuing students to become involved in their community. A list of CCU Marine Science oriented clubs is provided below.

Aqua League (Scuba Squad)

<https://coastal.campuslabs.com/engage/organization/aqualeague>

Aqua League is the SCUBA diving club at Coastal Carolina University. Everyone is welcome - divers and non-divers

Coastal Elasmobranch Society (CES)

<https://coastal.campuslabs.com/engage/organization/coastalelasmobranchsocietymarine>

The CES is a society devoted to raising funds for the scientific study of living and fossil chondrichthyans (sharks, skates, rays and chimaeras).

Coastal Saltwater Anglers

<https://coastal.campuslabs.com/engage/organization/coastalsaltwateranglers>

Coastal Carolina students addicted to saltwater fishing. Southern Kingfish Association Division 9 Open Class Tournament Team

Coastal Sea Turtle Club

<https://coastal.campuslabs.com/engage/organization/seaturtleclub>

The goal of this organization is to increase the interest and education of sea turtles and their conservation

FACULTY

Dr. April Abbott (Ph.D., Assistant Professor, Academic Advisor, email: aabbott1@coastal.edu) is a marine geologist with experience working with both organic and inorganic paleoclimate proxies. Her current research focus is on the pore water geochemistry of trace metals to explore how the interaction between marine sediments and the overlying water column can improve our interpretations of sedimentary records of Earth's past climates.

Dr. Daniel Abel (Ph.D., Professor, Academic Advisor, email: dabel@coastal.edu) has research interests in the fields of shark biology and environmental science.

Dr. George Boneillo (Ph.D., Senior Lecturer, e-mail: gboneillo@coastal.edu) has research interests in plankton ecology and nutrient dynamics in coastal ecosystems.

Dr. Shaowu Bao (Ph.D., Associate Professor, Academic Advisor, email: sbao@coastal.edu) is a physical oceanographer whose research uses computer models to investigate the interactively coupled coastal environmental atmospheric, oceanic, and hydrologic processes and improve model predictions of high-impact severe weather events such as tropical cyclones and winter storms, and the natural hazards associated with these weather events such as storm surge, wave flooding, and marine pollution.

Dr. Erin Burge (Ph.D., Professor, Academic Advisor, email: eburge@coastal.edu) is a molecular marine biologist who has investigated numerous topics, including host-pathogen interactions between striped bass and mycobacteria, shrimp immune gene expression, ecotoxicology in the mummichog, and the environmental immunology of oysters. He also studies fish behavior and ecology, most recently with his Frying Pan Shoal, NC underwater video SharkCam hosted at www.explore.org

Dr. Diane Fribance (Ph.D., Professor, Academic Advisor, email: dfribance@coastal.edu) is a physical oceanographer whose research focuses on the physics of the coastal oceans, including estuarine health and circulation, effects of hurricanes on coastal transport, and the connections between seafloor topography and mixing rates.

Dr. Jane Guentzel (Ph.D., Professor, email: jguentzel@coastal.edu) is a marine and environmental chemist whose research focuses on the biogeochemistry of mercury and other trace elements in aquatic systems; the influence of atmospheric deposition and transport on the cycling of mercury and trace elements in these systems; and the abundance and distribution of plastics in freshwater and marine environments.

Dr. Erin Hackett (Ph.D., Professor, Academic Advisor, email: ehackett@coastal.edu) is a physical oceanographer. Her research is in the general area of fluid dynamics with focus on turbulence (mixing), waves, and boundary layers. Dr. Hackett uses a combination of laboratory and field studies to examine these topics.

Dr. Till Hanebuth (Ph.D., Professor, Academic Advisor, email: thanebuth@coastal.edu) is a marine geologist who studies a variety of coastal and marine topics from rivers to the deep ocean.

Dr. Angelos Hannides (Ph.D., Associate Professor, Academic Advisor, email: ahannides@coastal.edu) is a marine chemist specializing in marine biogeochemistry and he focuses on organic matter cycling and nutrient dynamics.

Dr. Juliana Harding (Department Chair, Ph.D., Professor, Academic Advisor, email: jharding@coastal.edu) is a marine community ecologist with interests in coastal ecology, population dynamics, and ecosystem function as well as larval biology and culture, molluscan ecology, aquaculture, sclerochronology and scleroarchaeology.

Dr. Bret Jarrett (Ph.D., Lecturer, email: bjarret@coastal.edu) is a marine geologist with more than 20 years of experience performing geological and geophysical studies.

Dr. Ryan Rezek (Ph.D., Assistant Professor, Academic Advisor, email: rrezek@coastal.edu) is a marine biologist specializing in ecosystem restoration. His research investigates how community and food web structure of coastal ecosystems are modified by restoration and anthropogenic drivers of ecological change.

Dr. Eric Rosch (Ph.D., Senior Lecturer, email: erosch@coastal.edu) is a marine biologist with research interests in marine invertebrate behavior and ecology, especially crustaceans.

Dr. Zhixiong Shen (Ph.D., Associate Professor, Academic Advisor, email: zshen@coastal.edu) is a marine geologist with research interests in Quaternary geochronology, Earth surface processes, neotectonics, environmental change, sea-level change and fluvial and coastal geology.

Dr. Lauren Stefaniak (Ph.D., Assistant Professor, Academic Advisor, email: lstefani@coastal.edu) is a marine biologist and molecular ecologist with research interests including benthic marine ecology on the individual, population, and community levels, with a particular focus on the biological and physical controls of species distributions and how differential population connectivity, direct human activities (introduced species, coastal hardening, artificial reefs, etc.), and climate change can alter species distributions.

Ms. Margaret Stoughton (Senior Lecturer, email: mstoughton@coastal.edu) is a biological oceanographer whose research interests include bio-optical modeling and photosynthesis of seagrass.

Dr. Richard Viso (Ph.D., Professor, email: rviso@coastal.edu) is a marine and coastal geologist whose research interests include application of geophysical imaging techniques to coastal, marine, and seafloor environments.

Dr. Keith Walters (Ph.D., Professor, Academic Advisor, email: kwalt@coastal.edu) is a marine ecologist with research interests including wetland and oyster reef dynamics and restoration, terrestrial boundary development effects on wetlands, trait mediated predation effects on estuarine invertebrate populations, and salt marsh plant-animal interactions.

Dr. Eric Wright (Ph.D., Professor, Academic Advisor, email: ewright@coastal.edu) is a marine and coastal geologist with research interests focused on the geologic development and sedimentology of coastal, shelf and wetland environments.

Dr. Robert Young (Ph.D., Professor, email: ryoung@coastal.edu) is a marine biologist whose research interests include the ecology, behavior, and management of fishes and marine mammals, as well as other areas of coastal and estuarine ecology.

Appendix

Department of Marine Science Minors

COASTAL GEOLOGY MINOR

The curriculum in the coastal geology minor is designed to provide the student with a thorough education in geologic processes and features typical of coastal areas. The program provides rigorous education and practical field experience for students preparing for a career or graduate education in coastal geological studies. Students interested in pursuing the coastal geology minor should consult with their major adviser and the coordinator of the geology minor to plan their program of study as early as possible. A student must earn a grade of 'C' or better in all courses to be applied toward the minor in coastal geology.

Choose one from the following: (4 credits)

GEOL 102/102L Environmental Geology/Laboratory (=MSCI 102/102L)

GEOL 111/111L Physical Geology/Laboratory

GEOL 112/112L Introduction to Earth and Marine Geology/Laboratory (=MSCI 112/112L)

Complete the following: (8 credits)

GEOL 304/304L Marine Geology/Laboratory (=MSCI 304/304L)

GEOL 316/316L Sedimentary Geology/Laboratory (=MSCI 316/316L)

Choose two from the following: (8 credits)

GEOL 300/300L or above

MSCI 397 Q* Marine Science Senior Thesis Research Methods (1 to 4 credits)

MSCI 399 Q* Independent Study (1 to 4 credits)

MSCI 416/416L Hydrogeology/Laboratory (=GEOL 416/416L) (4 credits)

MSCI 440/440L Applied Coastal Geophysics (4 credits)

MSCI 444/444L Long-term Climate and Landscape Change/Laboratory (4 credits)

MSCI 445/445L Coastal Processes/Laboratory (4 credits)

MSCI 497 Q* Marine Science Senior Thesis (3 to 6 credits)

MSCI 499 Q* Directed Undergraduate Research (3 to 6 credits)

TOTAL CREDITS REQUIRED: 20 credits

* No more than four credit hours of independent study, internship, and/or directed undergraduate research and/or senior thesis may be used toward minor credit.

ENVIRONMENTAL SCIENCE MINOR

The curriculum in the environmental science minor (ENVI) is designed to provide students with a rigorous interdisciplinary education in environmental science so they will possess the skills and knowledge needed to find effective, informed and ethical solutions to problems that involve interactions between physical, chemical, biological, economic and social factors. The program is designed as preparation for students seeking environmental careers, including enrollment in graduate programs, in areas including environmental policy and management, environmental education, and environmental monitoring and assessment.

Students pursuing the environmental science minor must consult with their major advisor and Dr. Craig Gilman in the Department of Marine Science who administers the minor. Students should enroll in ENVI 201/L Introduction to Environmental Science during their sophomore or junior year and then enroll in ENVI 420/L Advanced Environmental Science the following year. A grade of 'C' or better is required in all upper level courses and in ENVI 201/L and ENVI 420/L.

Complete the following courses:

- BIOL 121 Biological Science I (3 credits)
- BIOL 122 Biological Science II (3 credits)
- CHEM 111/L General Chemistry I (4 credits)
- CHEM 112/L General Chemistry II (4 credits)
- MATH 160 /160A/160B Calculus I (4 credits)
- STAT 201/L Elementary Statistics (4 credits)
- ENVI 201/L Introduction to Environmental Science (4 credits)
- ENVI 420/L Advanced Environmental Science (4 credits)

Choose from the following: (8 credits)

Either: PHYS 201/L General Physics I (4 credits) AND PHYS 202/L General Physics II (4 credits)

Or: PHYS 211/L Essentials of Physics I (4 credits) AND PHYS 212/L Essentials of Physics II (4 credits)

Choose three courses and the corresponding laboratories: (11-12 credits)

- BIOL 370/L Principles of Ecology (4 credits)
- BIOL 481/L Freshwater Ecology (4 credits)
- BIOL 484/L Conservation Ecology (4 credits)
- BIOL 488/L Wetland Plant Ecology (4 credits)
- ENVI 399 Independent Study/Internship (1 to 4 credits) *
- ENVI 487 Selected Topics in Environmental Science (1 to 6 credits) *
- ENVI 499 Directed Undergraduate Research (3 to 6 credits) *
- MATH 242/L Modeling for Scientists I (4 credits)
- MSCI 321/L Atmospheric Science (4 credits)
- MSCI 331/L Introduction to Geographic Information Systems (GIS) and Remote Sensing (4 credits)
- MSCI 355/L Introduction to Environmental Ecotoxicology (4 credits)
- MSCI 401/L Environmental Chemistry (4 credits)
- MSCI 402/L Analytical and Field Methods in Environmental Chemistry (4 credits)
- MSCI 474/L Ecosystems Analysis (4 credits)
- MSCI 475/L Marine Ecology (4 credits)
- MSCI 495/L Marine Environmental Issues(4 credits)
- PHIL 319 Environmental Ethics - (3 credits)

TOTAL CREDITS REQUIRED: 49-50 credits

* A maximum of six credits from ENVI 399, ENVI 487, and ENVI 499 may be applied towards the minor.

MARINE SCIENCE MINOR

Complete the following courses (8 credits):

MSCI 111/111L Introduction to Marine Science/Laboratory

MSCI 112/112L Introduction to Earth and Marine Geology/Laboratory

Choose twelve credits of MSCI courses at the 300 level or above of which 8 credits must be taken from the following:

MSCI 301/301L Physical Oceanography/Laboratory (4 credits)

MSCI 302/302L Marine Biology/Laboratory (4 credits)

MSCI 304/304L Marine Geology/Laboratory (4 credits)

MSCI 305/305L Marine Chemistry/Laboratory (4 credits)

TOTAL CREDITS REQUIRED: 20 credits

- No more than four credit hours of MSCI 397, 398, 399, MSCI 497, 498 and/or MSCI 499 may be included in the minor.
- A grade of 'C' or better is required in each course to be applied toward the minor