MARINE SCIENCES | CLAS

Oceans are an important facet of the global environment: covering more than 70 percent of the Earth's surface, oceans provide us with food, transport, and resources and they play a significant role in controlling climate. However, the world's oceans remain largely unexplored below the surface, making them one of the last great frontiers for scientific discovery. Marine environments are inherently dynamic and governed by a broad suite of interactive biological, chemical, and physical processes.

About this Program

- **College:** Liberal Arts and Sciences (https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/)
- **Degree:** Bachelor of Science
- **Credits for Degree:** 120

To graduate with this major, students must complete all university, college, and major requirements.

Related Programs

- Fisheries and Aquatic Sciences Minor

The university offers an integrated approach to marine science education and research to prepare students for rewarding academic and professional careers. This major, offered cooperatively with the College of Agricultural and Life Sciences, lets students tailor a curriculum that suits their interests and career goals.

The curriculum provides the core scientific and quantitative skills necessary for success. Lower-division courses build a strong foundation in basic sciences and math while upper-division courses provide opportunity for specialization. Students in the College of Liberal Arts and Sciences (CLAS) complete an upper-division core that integrates the physical and biological sciences, mathematics, and engineering. They work closely with a faculty advisor to create an individualized curriculum of at least 12 credits of approved electives; this plan must be approved by the program's undergraduate coordinator before the student has earned 70 credits.

Requirements for the Major

The Marine Science major requires 34-37 credits of foundation coursework and 28-30 credits of major coursework for a total of 62-67 credits of coursework completed.

All major courses must be completed with minimum grades of C. At least 30 credits of coursework in the major must be UF credit.

Required Major Coursework

Code	Title	Credits
Required Foundation Coursework		
BSC 2010 & 2010L	Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory	4
BSC 2011 & 2011L	Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2	4
CHM 2045 & 2045L	General Chemistry 1 and General Chemistry Laboratory	4
CHM 2046 & 2046L	General Chemistry 2 and General Chemistry 2 Laboratory	4
MAC 2311	Analytic Geometry and Calculus 1	4
MAC 2312	Analytic Geometry and Calculus 2	3-4
or STA 2023	Introduction to Statistics 1	
OCE 1001	Introduction to Oceanography	3
Physics Sequence, Select one:		*8 - 10*
Option One		
PHY 2053 & 2053L	Physics 1 and Laboratory for PHY 2053	
PHY 2054 & 2054L	Physics 2 and Laboratory for PHY 2054	
Option Two		
PHY 2048 & 2048L	Physics with Calculus 1 and Laboratory for PHY 2048	
PHY 2049 & 2049L	Physics with Calculus 2 and Laboratory for PHY 2049	
Required Foundation Coursework: 34-37 credits		

Marine Sciences Major Coursework: 13 -14 credits		
GLY 3083C	Fundamentals of Marine Sciences	3
GLY 4726	Chemical Oceanography	3
PCB 4460	Biodiversity and Ecology Field Immersion	3-4
or FAS 4270	Marine Ecological Processes	
ZOO 4403C	Marine Biology	4
Marine Sciences Major Electives: 15-16 credits		
Approved marine sciences electives [1]		12
Marine sciences core elective		3-4
Total Marine Sciences Major Coursework: 28-30 credits		
Total Credits		**62-67**

[1] 12 credits of approved Marine Sciences electives, approved by the undergraduate coordinator before the student has earned 70 credits. Electives may be chosen from the Approved Electives tab.

Critical Tracking

For degree requirements outside of the major, refer to CLAS Degree Requirements: Structure of a CLAS Degree *(*https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/#degreerequirementstext*).*

Critical Tracking records each student's progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

For the purposes of critical-tracking, associated lecture and lab courses are considered one critical-tracking course (e.g., BSC 2010/BSC 2010L = 1 critical-tracking course).

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (https://cpm.flvc.org/advance-search/) may be used for transfer students.

Semester 1

- Complete OCE 1001 and 1 critical-tracking course from BSC 2010/BSC 2010L, BSC 2011/BSC 2011L, CHM 2045/CHM 2045L, CHM 2046/CHM 2046L, MAC 2311, PHY 2053/PHY 2053L (or PHY 2048/PHY 2048
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 2

- Complete 2 additional critical-tracking courses
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 3

- Complete 1 additional critical-tracking course
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 4

- Complete 2 additional critical-tracking courses
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 5

- Complete all 8 critical-tracking courses
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 6

- Complete FAS 4270 or PCB 4460
- 2.0 UF GPA required

Semester 7

- Complete General Education course
- 2.0 UF GPA required

Semester 8

- Complete all remaining General Education requirements
- 2.0 UF GPA required

Model Semester Plan

Students are expected to complete the Writing, Civic Literacy, summer enrollment, and Quest requirements while in the process of taking the courses below. Students are also expected to complete the General Education International (GE-N) requirements concurrently with another General Education requirement (typically, GE-C, H, or S) as part of the CLAS Basic Distribution requirements. One of the two general education mathematics courses must be a pure math course.

College of Liberal Arts and Sciences allows students additional flexibility in its Distribution Requirements. Students may count a maximum of 6 credits TOTAL from the CLAS Distribution course lists towards Humanities, Social and Behavioral Sciences, or Biological and Physical Sciences, with no more than 3 credits of Humanities, 3 credits of Social and Behavioral Sciences, or 6 credits of Biological or Physical Sciences.

The full list of major-specific requirements for this major can be found on the Overview tab. College of Liberal Arts and Sciences degree requirements can be found on the college's degree requirements page (https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/#degreerequirementstext).

MAC 2312, PHY 2049 and PHY 2049L, and PHY 2054 and PHY 2054L may count towards the 3000-level or above electives outside of the major.

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.

Course	Title	Credits
Semester One		
Quest 1		3
CHM 2045 & 2045L	General Chemistry 1 and General Chemistry Laboratory (**Critical Tracking**; State Core Gen Ed Physical Sciences)	4
Select one:		4
MAC 2311	Analytic Geometry and Calculus 1 (**Critical Tracking**; State Core Gen Ed Mathematics)	
MAC 1147	Algebra and Trigonometry [1]	
OCE 1001	Introduction to Oceanography (**Critical Tracking**; Gen Ed Physical Sciences)	3
	Credits	**14**
Semester Two		
CHM 2046 & 2046L	General Chemistry 2 and General Chemistry 2 Laboratory (**Critical Tracking**; Gen Ed Physical Sciences)	4
Select one:		3-4
Elective		
MAC 2311	Analytic Geometry and Calculus 1 (if not taken in semester one)	
State Core Gen Ed Composition (https://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement		3
State Core Gen Ed Humanities (https://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
State Core Gen Ed Social and Behavioral Sciences (https://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**16-17**
Semester Three		
BSC 2010 & 2010L	Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory (**Critical Tracking**; Gen Ed Biological Sciences)	4
GLY 3083C	Fundamentals of Marine Sciences	3
Select one:		3-4

MAC 2312	Analytic Geometry and Calculus 2 (Gen Ed Mathematics)	
STA 2023	Introduction to Statistics 1 (Gen Ed Mathematics)	
Gen Ed Humanities		3
Elective (3000 level or above, not in major)		3
	Credits	**16-17**
Semester Four		
Quest 2		3
BSC 2011	Integrated Principles of Biology 2	4
& 2011L	and Integrated Principles of Biology Laboratory 2 (**Critical Tracking**; Gen Ed Biological Sciences)	
Select one:		4-5
PHY 2053	Physics 1	
& 2053L	and Laboratory for PHY 2053 (**Critical Tracking**; Gen Ed Physical Sciences)	
PHY 2048	Physics with Calculus 1	
& 2048L	and Laboratory for PHY 2048 (**Critical Tracking**; Gen Ed Physical Sciences)	
Elective (3000 level or above, not in major)		3
	Credits	**14-15**
Semester Five		
Select one:		4-5
PHY 2054	Physics 2	
& 2054L	and Laboratory for PHY 2054 (**Critical Tracking**; Gen Ed Physical Sciences)	
PHY 2049	Physics with Calculus 2	
& 2049L	and Laboratory for PHY 2049 (**Critical Tracking**; Gen Ed Physical Sciences)	
ZOO 4403C	Marine Biology	4
Gen Ed Humanities		3
CLAS Foreign Language Proficiency Requirement [2]		5
	Credits	**16-17**
Semester Six		
GLY 4726	Chemical Oceanography	3
PCB 4460	Biodiversity and Ecology Field Immersion (**Critical Tracking**) [2]	3-4
or FAS 4270	or Marine Ecological Processes	
Gen Ed Composition; Writing Requirement		3
CLAS Foreign Language Proficiency Requirement [2]		5
	Credits	**14-15**
Semester Seven		
Marine sciences core elective		3-4
Gen Ed Social and Behavioral Sciences		3
Approved marine sciences elective		3
Electives (3000 level or above, not in major)		6
	Credits	**15-16**
Semester Eight		
Gen Ed Social and Behavioral Sciences		3
Approved marine sciences elective		9
Elective (3000 level or above, not in major)		3
	Credits	**15**
	Total Credits	**120**

1 Select MAC 1147 if needed.

2 CLAS Foreign Language Proficiency Requirement (https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/#degreerequirementstext)

Approved Electives

Marine Sciences Core Elective

Code	Title	Credits
Select one:		3-4
GLY 2010C	Physical Geology (Gen Ed Physical Sciences)	
GLY 2100C	Historical Geology (Gen Ed Physical Sciences)	
GLY 3074	Oceans and Global Climate Change (Gen Ed Physical Sciences) [1]	
GLY 3105C	Evolution of Earth and Life (Gen Ed Physical Sciences) [1]	

GLY 3202C	Earth Materials [1]
EGN 4932	Special Topics (Physical Oceanography) [1]

[1] These courses cannot count as marine sciences core electives and approved electives.

Approved Marine Sciences Electives

Code	Title	Credits
Select 12 credits (minimum):		12
EGN 4932	Special Topics (Physical Oceanography) [1]	
ESC 3075	Deltas and Humans	
FAS 4202C	Biology of Fishes	
FAS 4305C	Introduction to Freshwater Fishery Science	
FAS 4405	Aquariums, Water and Aquaculture	
FAS 4932	Topics in Fisheries and Aquatic Sciences (Marine Adaptations)	
GLY 3074	Oceans and Global Climate Change (Gen Ed Physical Sciences) [1]	
GLY 3105C	Evolution of Earth and Life (Gen Ed Physical Sciences) [1]	
GLY 3202C	Earth Materials [1]	
GLY 3603C	Paleontology	
GLY 4450	Geophysics	
GLY 4552C	Sedimentary Geology	
GLY 4734	Coastal Morphology and Processes	
GLY 4930	Special Topics in Geology (Estuarine Systems)	
OCE 3016	Introduction to Coastal and Oceanographic Engineering	
ZOO 4205C	Invertebrate Biodiversity	

[1] These courses cannot count as marine sciences core electives and approved electives.

Additional Electives | With Instructor Permission

Code	Title	Credits
EOC 6196	Littoral Processes	3
EOC 6934	Advanced Topics in Coastal and Oceanographic Engineering	3
FAS 5276C	Field Ecology of Aquatic Organisms	4
FAS 6171	Applied Phycology	
GLY 5255	Organic Geochemistry and Geobiology	3
GLY 5558C	Sedimentology	3
GLY 5736	Marine Geology	3
GLY 5786L	Topics in Field Geology (Bahamas)	2
GLY 6075	Global Climate Change: Past, Present, and Future	3
GLY 6425	Tectonics	3
GLY6726	Chemical Biomarkers in Aquatic Ecosystems (instructor permission required).	
GLY 6932	Special Topics in Geology (Chemical Biomarkers in Aquatic Ecosystems)	3
OCP 6050	Physical Oceanography	3
OCP 6168	Data Analysis Techniques for Coastal and Ocean Engineers	3
OCP 6295	Estuarine and Shelf Hydrodynamics I	3
PCB 4460	Biodiversity and Ecology Field Immersion	4
ZOO 4926	Special Topics in Zoology (Biology of Sea Turtles)	1-4
ZOO 6456C	Ichthyology	4

[1] These courses cannot count as marine sciences core electives and approved electives.

Academic Learning Compact

This major provides integrative understanding of the basic concepts, theories and observational findings related to marine materials and processes, geologic time, the diversity of marine life, the structure and function of marine organisms and ecosystems and marine resource management.

The Marine Sciences major is administered jointly by the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences and utilizes faculty, courses and resources of the Fisheries and Aquatic Sciences Program (CALS), the Department of Geological Sciences (CLAS), the Department of Biology (CLAS), and the Department of Civil and Coastal Engineering (Herbert Wertheim College of Engineering).

Before Graduating Students Must

- Achieve a passing score on the subject test. The content of the examination has been reviewed and approved by the Marine Sciences Committee.
- Achieve a passing score on the analytical skills test. The content of the examination has been reviewed and approved by the Marine Sciences Committee.
- Achieve a passing score on the bioethics quiz. The content of the examination has been reviewed and approved by the Marine Sciences Committee.
- Achieve a passing score on the scientific literacy paper. This paper is assessed using a rubric that has been reviewed and approved by the Marine Sciences Committee.
- Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Student Learning Outcomes | SLOs

Content

1. Demonstrate competence in the basic terminology, concepts, methodologies, and theories used within the marine sciences.

Critical Thinking

2. Analyze information in the marine sciences and develop reasoned solutions to problems using the processes and applications of scientific inquiry.
3. Discriminate ethical behavior from unethical behavior in scientific research.

Communication

4. Communicate knowledge, ideas, and reasoning clearly, effectively, and objectively in written or oral forms appropriate to the marine sciences.

Curriculum Map

I = Introduced; R = Reinforced; A = Assessed

Courses	SLO 1	SLO 2	SLO 3	SLO 4
GLY 3083C	I	I	I	I
GLY 4930	R	R	R	R
OCE 1001	I		I	I
ZOO 4403C	R	R	R	R
ZOO 4926 (Marine Ecology) or FAS 4932 (Marine Ecological Processes)	A	A	A	A

Assessment Types

- Marine sciences subject and analytical skills tests
- Bioethics quiz
- Scientific paper