MARINE SCIENCES | CALS

From oceans to coastal wetlands, students will learn about marine organisms and their behaviors and interactions with the environment. Marine Sciences students study oceanography, statistics, fisheries and aquatic sciences, and invertebrate biodiversity. Students can focus elective courses on ecology, organismal biology, economics, human dimensions, and/or quantitative or professional skills.

About this Program

- **College:** Agricultural and Life Sciences (https://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/)
- **Degree:** Bachelor of Science
- **Credits for Degree:** 120
- **More Info**

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

Related Programs

- Combination Degrees
- Fisheries and Aquatic Sciences Minor
- Natural Resource Conservation

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

The curriculum provides students with 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 Agricultural and Life Sciences (CALS) complete an upper-division core that concentrates on biological and ecological marine science essentials while also giving students a critical understanding of how statistics and economics are integrated into marine science and resource management.

Students work closely with a faculty advisor to create an individualized curriculum plan of at least 18 approved elective credits and 15-16 planned credits. These can include courses on resource management, human dimensions, conservation, quantitative population assessment and others. Students must complete their plans along with the approval of a faculty advisor before reaching 70 credits.

Coursework for the Major

The major requires 120 credits and at least 30 credits of upper-division coursework in the major must be completed at UF.

Required Coursework

Code	Title	Credits
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
FAS 4202C	Biology of Fishes	4
OCE 1001	Introduction to Oceanography	3
STA 2023	Introduction to Statistics 1	3
Select one:		3
FAS 4270	Marine Ecological Processes	
ZOO 4926	Special Topics in Zoology (Marine Ecology)	
FAS 4932	Topics in Fisheries and Aquatic Sciences (Biology and Ecology of Algae)	3
Select one:		3
FNR 3410C	Natural Resource Sampling	
STA 3024	Introduction to Statistics 2	
STA 4210	Regression Analysis	
STA 4222	Sample Survey Design	
FNR 4660	Natural Resource Policy and Economics	3
GLY 3083C	Fundamentals of Marine Sciences	3
MAC 2311	Analytic Geometry and Calculus 1	4

PHY 2004 & 2004L	Applied Physics 1 and Laboratory for Physics 2004	4
ZOO 4205C	Invertebrate Biodiversity	4
Approved marine sciences electives		18
Planned electives, sufficient to reach a total of 60 upper-division credits		15-16
Total Credits		**86-87**

Critical Tracking

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.

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 of the following, excluding labs: BSC 2010/BSC 2010L, BSC 2011/BSC 2011L, CHM 2045/CHM 2045L, CHM 2046/CHM 2046L, MAC 2311, PHY 2004/PHY 2004L
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 2

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

Semester 3

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

Semester 4

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

Semester 5

- Complete all critical-tracking courses, including labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required
- 2.0 Upper Division GPA required

Semester 6

- Complete 1 of the remaining required major courses from STA 2023, FAS 4202C, FAS 4270 or PCB 4460, FNR 3410C or STA 3024 or STA 4210 or STA 4222, FAS 4932, GLY 3083C, FNR 4660, ZOO 4205C
- Submit faculty advisor-approved Curriculum Plan
- 2.0 Upper Division GPA required
- 2.0 UF GPA required

Semester 7

- Complete 3 additional remaining required major courses
- 2.0 Upper Division GPA required
- 2.0 UF GPA required

Semester 8

- Complete all remaining required major courses
- 2.0 Upper Division GPA required
- 2.0 UF GPA required

Model Semester Plan

Students are expected to complete the Writing Requirement while in the process of taking the courses below. Students are also expected to complete the General Education International (GE-N) requirement concurrently with another General Education requirement (typically, GE-C, H, or S).

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 (Gen Ed Humanities)		3
CHM 2045 & 2045L	General Chemistry 1 and General Chemistry Laboratory (**Critical Tracking**; State Core Gen Ed Biological and Physical Sciences)	4
OCE 1001	Introduction to Oceanography (**Critical Tracking**; Gen Ed Biological Sciences and Physical Sciences)	3
State Core Gen Ed Composition (https://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement		3
State Core Gen Ed Social and Behavioral Sciences (https://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**16**
Semester Two		
Quest 2		3
CHM 2046 & 2046L	General Chemistry 2 and General Chemistry 2 Laboratory (**Critical Tracking**; Gen Ed Biological Sciences and Physical Sciences)	4
MAC 2311	Analytic Geometry and Calculus 1 (**Critical Tracking**; State Core Gen Ed Mathematics)	4
State Core Gen Ed Humanities (https://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**14**
Semester Three		
Select one:		4
AEB 3103	Principles of Food and Resource Economics	
ECO 2023	Principles of Microeconomics	
ECO 2013	Principles of Macroeconomics (Gen Ed Social and Behavioral Sciences)	
BSC 2010 & 2010L	Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory (**Critical Tracking**; Gen Ed Biological Sciences and Physical Sciences)	4
Gen Ed Composition; Writing Requirement		3
MAC 2312	Analytic Geometry and Calculus 2 (recommended elective)	4
	Credits	**15**
Semester Four		
BSC 2011 & 2011L	Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2 (**Critical Tracking**; Gen Ed Biological Sciences and Physical Sciences)	4
PHY 2004 & 2004L	Applied Physics 1 and Laboratory for Physics 2004 (**Critical Tracking**; Gen Ed Biological Sciences and Physical Sciences)	4
STA 2023	Introduction to Statistics 1 (Gen Ed Mathematics)	3
FAS 2024	Sustainable Fisheries (Recommended elective)	3
	Credits	**14**
Semester Five		
AEC 3030C or SPC 2608	Effective Oral Communication or Introduction to Public Speaking	3
Select one:		3

FNR 3410C	Natural Resource Sampling	
STA 3024	Introduction to Statistics 2	
STA 4210	Regression Analysis	
STA 4222	Sample Survey Design	
CHM 2200 & 2200L	Fundamentals of Organic Chemistry and Fundamentals of Organic Chemistry Laboratory (recommended electives)	4
Elective		3
	Credits	**13**
Semester Six		
FAS 4932	Topics in Fisheries and Aquatic Sciences (**Critical Tracking**)	3
GLY 3083C	Fundamentals of Marine Sciences (Gen Ed Biological and Physical Sciences; **Critical Tracking**)	3
ZOO 4205C	Invertebrate Biodiversity (**Critical Tracking**)	4
Approved electives		6
	Credits	**16**
Semester Seven		
Select one:		3
AEC 3033C	Research and Business Writing in Agricultural and Life Sciences (Writing Requirement)	
ENC 2210	Technical Writing (Writing Requirement)	
ENC 2256	Writing in the Disciplines	
FAS 4202C	Biology of Fishes (**Critical Tracking**)	4
Select one:		3
FAS 4270	Marine Ecological Processes (**Critical Tracking**)	
ZOO 4926	Special Topics in Zoology (Marine Ecology; **Critical Tracking**)	
FNR 4660	Natural Resource Policy and Economics (**Critical Tracking**)	3
Elective		3
	Credits	**16**
Semester Eight		
Approved electives		12
Electives		4
	Credits	**16**
	Total Credits	**120**

Approved Electives

APPROVED ELECTIVES | 18 CREDITS MINIMUM

Students meet with a faculty advisor to establish a curriculum plan for approved electives and planned electives and may focus these toward a specific area or a minor. For a broader program, students should select a minimum of three credits from each area of approved electives. Other options may include study abroad courses.

Ecology and Organismal Biology

Code	Title	Credits
FAS 2024	Sustainable Fisheries	3
FAS 4305C	Introduction to Freshwater Fishery Science	4
FAS 4932	Topics in Fisheries and Aquatic Sciences (Aquatic Invertebrate Ecological Physiology)	3
FAS 4932	Topics in Fisheries and Aquatic Sciences (Field Ecology of Aquatic Organisms)	4
FAS 4932	Topics in Fisheries and Aquatic Sciences (Coral Reef Ecology)	3
FAS 4932	Topics in Fisheries and Aquatic Sciences (Invasion Ecology of Aquatic Animals)	3
PCB 4043C	General Ecology	4
PCB 4674	Evolution	4
VME 4012	Aquatic Animal Conservation Issues	3
VME 4906	Problems in Veterinary Science (Introduction to Marine Wildlife)	3
WIS 3553C	Introduction to Conservation Genetics	4
WIS 4203C	Landscape Ecology and Conservation	3
ZOO 4403C	Marine Biology	4

Economics and Human Dimensions

Code	Title	Credits
AEB 3450	Introduction to Natural Resource and Environmental Economics	3
FNR 3602	Society and Natural Resources	3
GEO 4300	Environmental Biogeography	3
WIS 4523	Human Dimensions of Natural Resource Conservation	3

Physical/Chemical Oceanography

Code	Title	Credits
EGN 4932	Special Topics (Physical Oceanography)	3
GLY 3074	Oceans and Global Climate Change	3
GLY 4734	Coastal Morphology and Processes	3
GLY 4930	Special Topics in Geology (Geochemical Oceanography)	3

Professional Skills

Code	Title	Credits
GIS 3072C	Geographic Information Systems	3
Advanced Open Water and Science Diving		
Practicum or Internship		

Quantitative Ecological Skills

Code	Title	Credits
FAS 4932	Topics in Fisheries and Aquatic Sciences (Applied Fisheries Statistics)	4
FNR 3410C	Natural Resource Sampling [1]	3
STA 3024	Introduction to Statistics 2 [1]	3
STA 4210	Regression Analysis [1]	3
STA 4211	Design of Experiments	3
STA 4222	Sample Survey Design [1]	3
WIS 4501	Introduction to Wildlife Population Ecology	3
WIS 4601C	Quantitative Wildlife Ecology	3

[1] Use as an approved elective if not used to meet the quantitative requirement in semester seven.

Additional Approved Electives | With instructor permission

Code	Title	Credits
FAS 6337C	Fish Population Dynamics	4
GLY 6075	Global Climate Change: Past, Present, and Future	3
OCP 6295	Estuarine and Shelf Hydrodynamics I	3
ZOO 6406	Biology of Sea Turtles	3
ZOO 6456C	Ichthyology	4

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

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

Communication

5. 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
FAS 4202C	R	R	R	R
FAS 4932 (Biology and Ecology of Algae)	R	R	R	R
GLY 3083C	I	I	I	I
OCE 1001	I		I	I
ZOO 4205C	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