MARINE BIOLOGY

Overview

An Area of Concentration (AOC) in Marine Biology allows students to build a strong foundation in basic biological concepts, with an emphasis on marine organisms and ecosystems. This program of study is designed to prepare students for graduate or professional studies in marine biology, biological oceanography, or related subjects, as well as for professional careers in marine or environmental fields.

New College is situated on Sarasota Bay and our students have the opportunity to study and conduct research at the Pritzker Marine Biology Research Center, located on our Bayfront Campus. The Center is home to more than 100 aquaria, anchored by a 15,000-gallon research and display tank. Each tank in the Living Ecosystem Teaching and Research Aquarium features different captive ecosystems, including a cold-water rocky shore and Sarasota Bay grass flats. Through a natural filtration system designed by students, the Center draws and recycles water from Sarasota Bay.

A marine science research and sailing dock was completed in spring of 2022, which serves the Marine Biology program's 32-foot pontoon research boat, Limbatus; a smaller research skiff; and a rigid inflatable rescue vessel.

Faculty in Marine Biology

Erika Diaz Almeyda (https://www.ncf.edu/directory/erika-diaz-almeyda/), Assistant Professor of Biology and Environmental Studies (On Leave)
Jayne M. Gardiner (https://www.ncf.edu/directory/jayne-gardiner-loewy/), Associate Professor of Biology (On Leave)
Sandra Gilchrist (https://www.ncf.edu/directory/sandra-l-gilchrist/), Professor of Biology and Marine Science/Natural Sciences Division Chair
Athena Rycyk (https://www.ncf.edu/directory/athena-rycyk/), Associate Professor of Biology and Marine Science
Gerardo Toro-Farmer (https://www.ncf.edu/directory/gerardo-toro-farmer/), Associate Professor of Coastal and Marine Science

Requirements for the AOC in Marine Biology

A minimum of twenty-five (25) academic units.

Code	Title
Introductory Sequence [1]	
BIOL 2100	Foundations of Biology I*
BIOL 2200	Foundations of Biology II*
BIOL 2110	Foundations of Biology Laboratory
Introduction to the Properties of the Marine Environment Course	
BIOL 2650	Introduction to Oceanography*
or BIOL 2785	Introduction to Coastal Marine Systems
Intermediate Biology Lecture Coursework	
Select **one** lecture course from each category, for a total of **three** courses:	
Molecular/Cellular Scale Lectures	
BIOL 3500	Cell Biology
BIOL 3780	Developmental Biology
BIOL 3400	Introduction to Genetics
BIOL 3550	Introduction to Microbiology
BIOL 3200	Neurobiology
Organismic Scale Lectures	
BIOL 2460	Introduction to Entomology*
BIOL 3350	Introduction to Botany
BIOL 3370	Invertebrate Zoology
BIOL 3600	Fish Biology
BIOL 3660	Marine Mammal Biology
BIOL 3700	Biology of Sharks, Skates and Rays
BIOL 4400	Plant Physiology
BIOL 4500	Organismic Biology
Ecology/Evolution Scale Lectures	
BIOL 2360	Animal Behavior
BIOL 3100	Ecology*
BIOL 3120	Conservation Biology
BIOL 3140	Marine Ecology
BIOL 3300	Evolution
BIOL 4100	Principles of Ecological Management
Intermediate Biology Lab Coursework	
Select **one** lab in each category, for a total of **three** lab courses:	
Molecular/Cellular Scale Labs	
BIOL 3210	Neurobiology Laboratory
BIOL 3410	Classical Genetics Techniques Laboratory
BIOL 3420	Fundamentals of Applied Genetics Laboratory
BIOL 3510	Cell Biology Laboratory
BIOL 3560	Introduction to Microbiology Laboratory
Organismic Scale Labs	
BIOL 2465	Introduction to Entomology Laboratory
BIOL 3355	Introduction to Botany Laboratory
BIOL 3610	Fish Biology Laboratory
BIOL 3650	Sensory Biology of Fishes Lecture/Lab
BIOL 3710	Biology of Sharks, Skates and Rays Laboratory
BIOL 4410	Plant Physiology Laboratory
Ecology/Evolution Scale Labs	
BIOL 2500	Coral Reef Issues*
BIOL 3110	Ecology Laboratory
BIOL 3115	Florida Natural History
BIOL 3130	Methods in Field Ecology
BIOL 3145	Marine Ecology Laboratory
BIOL 3360	Animal Behavior Laboratory
Marine-Focused Courses or Tutorials	
Select at least **three** marine-focused courses or tutorials; some examples include: [2]	
BIOL 2550	Marine Pollution
BIOL 2785	Introduction to Coastal Marine Systems

BIOL 2850	Analysis of Florida Manatee Mortality Events
BIOL 3750	Coral Reef Ecology
BIOL 3755	Marine Bio-Optics
Natural Sciences Coursework for Marine Biology AOC	
Statistics Course	
Select **one** Statistics course from the following examples:	
BIOL 2150	Biostatistics
STAN 2700	Dealing with Data I*
STAT 2100	Introduction to Applied Statistics*
Quantitative and Computational Courses	
Select Calculus I and **one** additional quantitative or computational course:	
MATH 2311	Calculus I*
STAN 2800	Dealing with Data II
MATH 2312	Calculus II*
BIOL 2185	Applied Bioinformatics Laboratory
CSCI 2200	Introduction to Programming in Python*
Additional Natural Sciences Courses	
CHEM 2100	General Chemistry I*
CHEM 2150	General Chemistry II
CHEM 2160	General Chemistry Laboratory
PHYS 2525	Physics I (Calculus-based)*
PHYS 2510	Physics I Laboratory*
PHYS 2550	Physics II
PHYS 2555	Physics II Laboratory*
Strongly Recommended for Students Considering Graduate School	
CHEM 3100	Organic Chemistry I: Structure and Reactivity*
CHEM 3110	Organic Chemistry Inquiry Laboratory
CHEM 3600	Organic Chemistry II: Structure and Reactivity*
CHEM 3610	Organic Chemistry II Laboratory*
Independent Study Projects	
Select **one** Independent Study Project in Marine Biology (fieldwork is strongly recommended) and **one** in either Biology or Marine Biology.	
Recommended	
Students are encouraged to participate in internships and/or study at marine field stations to broaden their experience.	
Additional Requirements	
Senior Thesis in Marine Biology and Baccalaureate Exam [2]	

1 May be taken in any order.

2 A member of the Marine Biology faculty must serve as the thesis sponsor, and one other Biology or Marine Biology faculty member must also be a member of the student's thesis/baccalaureate exam committee.

Click here (https://drive.google.com/file/d/1JhWqb9pebH20vPxMjsiRyou-9fi00V81/view/?usp=sharing) for a Marine Biology Checklist.

Requirements for the Joint AOC in Marine Biology

A minimum of eight (8) academic units.

Code	Title
Introductory Sequence [1]	
BIOL 2100	Foundations of Biology I*
BIOL 2200	Foundations of Biology II*
BIOL 2110	Foundations of Biology Laboratory
Introduction to the Properties of the Marine Environment Course	
BIOL 2650	Introduction to Oceanography*
or BIOL 2785	Introduction to Coastal Marine Systems
Intermediate Marine Biology Lecture and Laboratory Courses [2]	
Select **two** intermediate lecture and **two** laboratory Marine Biology courses	
Additional Requirement [3]	
Senior Thesis with Marine Biology component, and Baccalaureate Exam	

1 May be taken in any order.

2 See intermediate lecture and laboratory courses listed under Marine Biology AOC requirements.

3 At least one member of the Marine Biology faculty must be a member of the student's thesis and baccalaureate exam committee.

Marine Biology Facilities

The Jack and Rhoda Pritzker Marine Biology Research Center (https://www.ncf.edu/academics/reasearch-new/pritzker-marine-biology-research-center/) (PMBRC) provides aquaria and holding facilities for marine organisms, laboratories, and tools that facilitate scientific experimentation. Seawater is pumped from Sarasota Bay, then preconditioned and treated prior to entering research aquaria. The Living Ecosystem Teaching and Research Aquarium includes five medium-sized aquaria, one large aquarium, and a single shallow tank. Each aquarium features a different captive ecosystem. Included are bay shore and local water ecosystems, and a diversity of near shore systems from non-local tropical to temperate regions. Cameras have been installed in the large aquarium and the medium live coral aquarium and send images to a streaming video server. This allows sharing of data on the web and permits detailed analysis of animal behavior in the tanks. Another camera in the invertebrate tank will be equipped with infrared capabilities for observations in near dark conditions, for expanded research opportunities. Faculty research laboratories, student research laboratories, and ground level tanks provide holding and culture facilities for maintaining organisms (both fish and marine invertebrates) for research and research education. The PMBRC's classroom contains a "wet" section with holding tanks and shallow sea tables. The sea tables are well suited to handling and observing small marine organisms. We have recently acquired a new stereomicroscope with pixel shift technology to produce high-resolution images.

A marine science research and sailing dock was completed in spring of 2022. The L-shaped dock is six feet wide and extends 294 feet west from the shore of the Caples campus and then 144 feet to the southwest, and the site was selected for its environmental compatibility and proximity to deep water. The dock was constructed with environmentally-friendly materials: Surestep PVC open deck grating, designed for maximum sunlight penetration to underwater aquatic life; and high-density

polyethylene piling wraps that protect the water from any chemicals in the treated wood pilings.

The dock currently serves the marine biology program's 32-foot pontoon research boat, Limbatus; a smaller research skiff; and a rigid inflatable rescue vessel. The dock bolsters New College's strong and popular programs in marine biology and environmental studies, as well as its summer marine biology education programs for teens in Sarasota and Manatee counties.

Representative Senior Theses in Marine Biology

- Effects of Glyphosate on the Odor Detection Behavior of Common Snook (*Centropomus undecimalis*)
- Sarasota Bay: a Newly-defined Nursery Area for Blacktip Sharks (*Carcharhinus limbatus*) on the Gulf Coast of Florida
- The Effects of Fish Waste Nutrient Enrichment on *Thalassia testudinum* Banks ex König in Sarasota Bay, Florida
- Mosquito Control to Kayak Trails: the Effects of Mangrove Ditches on the Sarasota Bay Region
- The Distribution of *Cyphoma gibbosum* (Mollusca: Gastropoda: Cypraeoidea: Ovulidae) (the Flaming Tongue Gastropod) in Relation to the Presence of the Fungal Disease Aspergillosis on Gorgonia spp. (Anthozoa: Cnidaria: Octocorallia: Gorgoniidae)
- Visually Mediated Behaviors of the Mantis Shrimp, *Pseudosquilla cilliata* (Fabricius, 1787) (Crustacea; Stomatopoda; Pseudosquillidae)
- Population Connectivity of *Acropora palmata* on Cayos Cochinos, Honduras
- The phenology of humpback (*Megaptera novaeangliae*), blue (*Balaenoptera musculus*), fin (*Balaenoptera physalus*), sperm (*Physeter macrocephalus*), and killer whales (*Orcinus orca*) determined by passive acoustic monitoring near Barkley Canyon.