

M.P.S. IN MARINE BIOLOGY AND ECOLOGY

Overview

The Master of Professional Science (M.P.S.) in Marine Biology and Ecology (MBE) program offers two tracks: **Marine Mammal Science** and **Tropical Marine Ecosystem Management**.

Marine Mammal Science Track

Students in the Marine Mammal Science (<https://mps.earth.miami.edu/degree-tracks/marine-mammal-science/>) (MMS) track will prepare for employment in marine mammal management (including associated ecosystems), population assessments, acoustics, and care.

Tropical Marine Ecosystem Management Track

The Tropical Marine Ecosystem Management (<https://mps.earth.miami.edu/degree-tracks/tropical-marine-ecosystem-management/>) (TME) track provides students with advanced training in the theoretical aspects of tropical marine ecology and the practical aspects needed to begin a career in this field.

Admission Requirements

General Prerequisites:

- [Bachelor of Science degree \(B.S.\) or Bachelor of Arts degree \(B.A.\)](#)
- [One year of general biology + general biology labs](#)
- [One year of general chemistry](#)
- [At least one semester of calculus](#)
- [Nine \(9\) additional credits in natural science \(research in these fields may, in some cases, substitute for coursework hours\)](#)

Note to students: Deficiencies in required coursework may be considered on a case-by-case basis for otherwise highly qualified students or those demonstrating experience with these skills.

All application requirements are available here (<https://mps.earth.miami.edu/prospective-students/admissions/>).

Curriculum Requirements

Marine Mammal Science Track

Code	Title	Credit Hours
Core Courses		
EVR 660 & EVR 661	Introduction to Marine Geographic Information Systems and Introduction to Marine Geographic Information Systems - Laboratory	3
EVR 670	Conservation and Management of Marine Mammals	3
MBE 604	Biology of Marine Mammals	3
MBE 605	Marine Mammal Disease and Medicine	3
MBE 746 or EVR 645	Marine Population Biology: Processes and Modeling Marine Population Assessment Surveys and Analysis	3
RSM 612 or EVR 624	Statistics for Marine Scientists Statistics and Data Analysis for Environmental Science and Policy	3
Electives		
The remaining courses may be selected from the following list or other courses approved by the academic advisor. *		
OCE 651	Applied Ocean Acoustics and Marine Mammals	3
Additional Elective		3
Internship¹		
MBE 805	MPS Internship	2-6
Additional Requirements		
RSM 700	Research Ethics	0
Total Credit Hours		30

* Refer to the list of additional elective options.

¹ Enrollment in 2 - 6 internship credits is required during a student's time in the M.P.S. degree program. Completion of less than 2 internship credits must be approved by M.P.S. Director. Students may enroll in more than 6 internship credits with the approval of the Program Director. Typically, two semesters are needed to complete all aspects of the internship phase of M.P.S.

Additional Elective Options

Students may substitute elective coursework for one or more of the above courses with the consent of their academic advisor. Below are a few examples of courses that past students in this program took as electives.

Code	Title	Credit Hours
MBE 606	Procedures in Marine Mammal Health and Disease	1
MBE 607	Marine Mammal Applied Behavior Analysis and Managed Care	3
MBE 608	Discussions of Marine Mammal Welfare	1
MBE 623	Marine Parasite Ecology	3
MBE 632	Marine Mammal Research Techniques	3
MBE 678	Evolutionary Genetics	3
MBE 716	Bayesian Statistics for Marine Scientists	3
EVR 601	Political Ecology of Marine Management	3
EVR 616	Ocean Policy	3
EVR 620	Environmental Law and Policy	3
EVR 673	Marine Conservation Outreach	3
EVR 710	International Ocean Law and Governance	3
EVR 720	Coastal Law and Policy	3
OCE 651	Applied Ocean Acoustics and Marine Mammals	3
RSM 640 & RSM 641	DEIA in Marine Science Broader Impacts: Theory Reflection and DEIA in Marine Science Broader Impacts: Practice Implementation	4
RSM 664 or RSM 667	Scientific Small Boating Motorboat Operator Certification Course	1-2
RSM 710	The Physical Environment of Marine Organisms	3
POL 631	Global Environment Politics	3

Curriculum Requirements

Tropical Marine Ecosystem Management Track

Code	Title	Credit Hours
Core Courses		
Ecology Requirement		
MBE 615	Tropical Marine Ecology	3
Statistics Requirement		
RSM 612 or EVR 624	Statistics for Marine Scientists Statistics and Data Analysis for Environmental Science and Policy	3
Policy Requirement		
EVR 620 or EVR 616 or EVR 631 or EVR 710 or EVR 720	Environmental Law and Policy Ocean Policy Marine and Coastal Protected Area Theory, Planning, Management, and Issues International Ocean Law and Governance Coastal Law and Policy	3
Field Requirement ¹		
MBE 621 or MBE 614 or MBE 637 or MBE 641 or MBE 644	Field Techniques and Instrumentation in Tropical Marine Ecology Tropical Marine Biology Practical Data Analysis for Marine Scientists Reef Restoration Techniques Tropical Coastal Restoration	3
Technical Skills Requirement ²		

EVR 660 & EVR 661	Introduction to Marine Geographic Information Systems and Introduction to Marine Geographic Information Systems - Laboratory	3
or EVR 610	Environmental Planning and the Environmental Impact Statement	
Electives		9
RSM 600	Introduction to Research Diving Techniques ³	
RSM 664 or RSM 667	Scientific Small Boating ³ Motorboat Operator Certification Course	
MBE 746 or EVR 629 or EVR 634 or MBE 618 or MBE 623 or MBE 638 or RSM 601	Marine Population Biology: Processes and Modeling * Biology, Ecology, and Management of Mangrove Ecosystems Shark Behavioral Ecology and Conservation Reef Coral Biology, Ecology, and Conservation Marine Parasite Ecology Tropical Marine Microbiomes Scientific Freediving	
Internship ⁴		2-6
MBE 805	MPS Internship	
Additional Requirements		
RSM 700	Research Ethics	
Total Credit Hours		30

¹ Students may choose another field course in MBE or EVR with the approval of their academic advisor.

² Students may take both courses if desired.

³ Enrollment is strongly encouraged. May be substituted for another elective with the approval of their academic advisor.

* Courses listed are suggestions. Students may choose other electives with the approval of their academic advisor and/or course instructor if special permission is required.

⁴ Enrollment in 2 - 6 internship credits is required during a student's time in the M.P.S. degree program. Completion of less than 2 internship credits must be approved by M.P.S. Director. Students may enroll in more than 6 internship credits with the approval of the Program Director. Typically, two semesters are needed to complete all aspects of the internship phase of M.P.S.

Additional Elective Options

Students may substitute elective coursework for one or more of the above courses with the consent of their academic advisor. Below are a few examples of courses that past students in this program took as electives.

Code	Title	Credit Hours
MBE 614	Tropical Marine Biology	3
MBE 633 & MBE 643	Ecology, Conservation, and Ecotourism in the Galapagos I and Ecology, Conservation, and Ecotourism in the Galapagos II - Field	3
MBE 678	Evolutionary Genetics	3
MBE 704	Biological Oceanography	3
MBE 716	Bayesian Statistics for Marine Scientists	3
EVR 601	Political Ecology of Marine Management	3
EVR 602	Economics of Natural Resources	3
EVR 604	Fieldwork in Coastal Management: Tourism, Conservation, and Development	3
EVR 610	Environmental Planning and the Environmental Impact Statement	3
EVR 614	Underwater Site Mapping and Visualization Techniques	3
EVR 616	Ocean Policy	3
EVR 620	Environmental Law and Policy	3
EVR 625	Fisheries Socioeconomics and Management	3
EVR 626	Submerged Cultural Resource Management	3
EVR 662	Intermediate Spatial Analysis	3
EVR 710	International Ocean Law and Governance	3
EVR 720	Coastal Law and Policy	3

RSM 633	Survey of Telemetry for Animal Movement Research	1
RSM 645	Science Communication: Professional Writing	1
RSM 646	Presentation Boot Camp	1
RSM 649	Advanced Presentation Boot Camp	1
RSM 710	The Physical Environment of Marine Organisms	3
BIL 623	Advanced Biology of Marine Invertebrates	4
POL 631	Global Environment Politics	3

Suggested Plan of Study

Marine Mammal Science Track

Year One		Credit Hours
Fall		
EVR 660 & EVR 661	Introduction to Marine Geographic Information Systems and Introduction to Marine Geographic Information Systems - Laboratory	3
EVR 670	Conservation and Management of Marine Mammals	3
MBE 604	Biology of Marine Mammals	3
RSM 612 or EVR 624	Statistics for Marine Scientists or Statistics and Data Analysis for Environmental Science and Policy	3
RSM 700	Research Ethics	0
Credit Hours		12
Spring		
MBE 605	Marine Mammal Disease and Medicine	3
MBE 746 or EVR 645	Marine Population Biology: Processes and Modeling or Marine Population Assessment Surveys and Analysis	3
MBE 606	Procedures in Marine Mammal Health and Disease *	1
MBE 607	Marine Mammal Applied Behavior Analysis and Managed Care *	3
OCE 651	Applied Ocean Acoustics and Marine Mammals *	3
Credit Hours		13
Summer		
MBE 632	Marine Mammal Research Techniques *	3
MBE 805	MPS Internship ¹	2-6
Credit Hours		5
Total Credit Hours		30

* or other approved Elective

¹ Enrollment in 2 - 6 internship credits is required during a student's time in the M.P.S. degree program. Completion of less than 2 internship credits must be approved by M.P.S. Director. Students may enroll in more than 6 internship credits with the approval of the Program Director. Typically, two semesters are needed to complete all aspects of the internship phase of M.P.S.

Tropical Marine Ecosystem Management Track

Year One		Credit Hours
Fall		
MBE 615	Tropical Marine Ecology	3
RSM 612 or EVR 624	Statistics for Marine Scientists or Statistics and Data Analysis for Environmental Science and Policy	3
RSM 600	Introduction to Research Diving Techniques * ¹	3
RSM 664 or 667	Scientific Small Boating * ¹ or Motorboat Operator Certification Course	2
EVR 620, 616, or 720	Environmental Law and Policy ² or Ocean Policy or Coastal Law and Policy	3
RSM 700	Research Ethics	0
Credit Hours		14

Spring		
EVR 660 & EVR 661 or 610	Introduction to Marine Geographic Information Systems ¹ or Environmental Planning and the Environmental Impact Statement	3
MBE 621	Field Techniques and Instrumentation in Tropical Marine Ecology ³	3
EVR 610	Environmental Planning and the Environmental Impact Statement ⁴	3
MBE 746	Marine Population Biology: Processes and Modeling ⁴	3
Credit Hours		12
Summer		
MBE 805	MPS Internship ⁵	2-6
Credit Hours		4
Total Credit Hours		30

* Enrollment is strongly encouraged. May be substituted for another elective with the approval of their academic advisor.

¹ Can be taken in Fall or Spring

² Additional Policy Options: EVR 631, EVR 710

³ Additional Field Options: MBE 614, MBE 637, MBE 641, MBE 644. Students may choose another field course in MBE or EVR with the approval of their academic advisor.

⁴ Suggested Options: EVR 629, EVR 634, MBE 618, MBE 623, MBE 638, RSM 601. Students may choose other electives with the approval of their academic advisor and/or course instructor if special permission is required.

⁵ Enrollment in 2 - 6 internship credits is required during a student's time in the M.P.S. degree program. Completion of less than 2 internship credits must be approved by M.P.S. Director. Students may enroll in more than 6 internship credits with the approval of the Program Director. Typically, two semesters are needed to complete all aspects of the internship phase of M.P.S.

Mission

Marine Mammal Science Track

The mission of the Marine Mammal Science (MMS) track is to prepare students for employment in marine mammal management (including associated ecosystems), population assessments, acoustics, research, and care. Coursework integrates a broad array of topics, such as marine mammal medicine and pathology, medical and clinical diagnostics, conservation and management, including state and federal regulations, applied ocean acoustics, research, education, and applied behavior analysis.

The MMS track provides opportunities for students to network with medical, training, and research experts in our community, as well as conduct an internship at one of many marine mammal rehab, managed care, or research facilities. As part of the practical training incorporated into the MMS curriculum, students will participate in mark-recapture surveys, public education, wild health assessments, behavior analysis and modification, clinical care and diagnostics, and necropsies, and attend and participate in regional and national conferences.

Tropical Marine Ecosystem Management Track

The mission of the Tropical Marine Ecosystem (TME) track is to prepare graduates for technical positions in marine conservation, management, and marine ecosystem science at one of a number of state and federal agencies, institutions, and NGOs by providing students with advanced training in the theoretical and practical aspects of tropical marine ecology. This program introduces students to theoretical aspects of nearshore benthic ecosystems common to tropical and subtropical regions worldwide (coral reefs, seagrasses, and mangroves) and emphasizes threats facing these ecosystems.

Practical aspects of the course expose students to field methods and techniques, taxonomy and identification of common vertebrates, invertebrates, algae and marine plants, GIS and remote sensing of shallow water marine environments, scientific diving (through the American Academy of Underwater Sciences), and small boat handling (through the Department of the Interior's Motorboat Operator Certification Course).

Student Learning Outcomes

Marine Mammal Science Track

- Students will have a strong foundation in marine mammal concepts and theories, with the ability to engage in productive academic and professional discussions with experts in the field.
- Students will be capable of evaluating specific threats to marine mammals and consider management objectives in light of cultural and socio-economic values, many of which will differ from their own.
- Students will be capable of thinking critically about question-based research and science-based management of marine mammals in the wild and in captivity, with an emphasis on ethics.
- Students will be able to effectively communicate marine mammal science to a variety of demographics, culminating in a meaningful and real-world contribution to outreach.
- Students will have a broader understanding of marine mammal managed care across various settings and will be capable of critically and strategically considering the intersection between animal care, welfare, management, and science.

- Students will demonstrate professionalism in all aspects of field and lab work during their internships.
- Students will submit a written final report and deliver a final presentation based on the work completed in their internship.

Tropical Marine Ecosystem Management Track

- Students will be able to effectively identify, understand, assess, and manage various tropical marine ecosystems.
- Students will demonstrate professionalism in all aspects of field and lab work during their internships.
- Students will submit a written final report and deliver a final presentation based on the work completed in their internship.