

M.P.S. IN OCEAN SCIENCES

Overview

The Master of Professional Science (M.P.S.) in Ocean Sciences (OCE) program offers two tracks: **Applied Remote Sensing** and **Natural Hazards and Catastrophes**.

Applied Remote Sensing Track

The routine use of remote sensing techniques has become an indispensable element of many activities in our modern world. A huge variety of sensors on satellites, airplanes, unmanned aerial vehicles (“drones”), and other platforms provide data for a variety of applications on a regular basis. The Applied Remote Sensing (<https://mps.earth.miami.edu/degree-tracks/applied-remote-sensing/>) (ARS) track offered by the Rosenstiel School of Marine, Atmospheric, and Earth Science and Center for Southeastern Tropical Advanced Remote Sensing (<https://www.earth.miami.edu/research/centers/cstars/>) (CSTARS) provides theoretical knowledge and experiential learning for careers in the field of remote sensing in both public and private sectors. Working professionals in this field may also acquire additional training to expand their current knowledge and skillset.

Natural Hazards and Catastrophes Track

The Rosenstiel School of Marine, Atmospheric, and Earth Science conducts world-class research on the earth systems responsible for natural disasters, including the atmosphere, the ocean, and solid earth. To meet society's need for a skilled workforce, the Natural Hazards and Catastrophes (<https://mps.earth.miami.edu/degree-tracks/natural-hazards-and-catastrophes/>) (NHC) track offers an educational opportunity for students seeking to fill positions offered by the private and civil sectors to assess risks and exposures associated with natural hazards.

Admission Requirements

General Prerequisites:

- Bachelor of Science degree (B.S.) or Bachelor of Arts degree (B.A.)

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/>).

Applied Remote Sensing Track

Additional Prerequisites:

- Bachelor of Science degree (B.S.) in Mathematics, Physics, Geosciences, Engineering, or an equivalent degree
- Successful completion of the following (or equivalent) undergraduate courses: calculus, statistics, physics, computer programming (Matlab, IDL, C, or Fortran)

Natural Hazards and Catastrophes Track

Additional Prerequisites:

- At least one of the following: one semester of statistics or calculus or six (6) credits in geoscience

Curriculum Requirements

Applied Remote Sensing Track

Code	Title	Credit Hours
Core Courses (6 credits)		
OCE 606	Introduction to Ocean Remote Sensing	3
OCE 707	Advanced Ocean Remote Sensing	3
Electives (18 credits)		
The remaining courses may be selected from the following list or other courses approved by the academic advisor. *		
OCE 603	Physical Oceanography	3
OCE 608	Introduction to Ocean Systems Engineering	3
EVR 660 & EVR 661	Introduction to Marine Geographic Information Systems and Introduction to Marine Geographic Information Systems - Laboratory	3
OCE 637	Natural Hazards: Atmosphere and Ocean	3
OCE 676	Wave Propagation in the Ocean Environment	3
RSM 612	Statistics for Marine Scientists	3
Internship ¹		

OCE 805	MPS Internship	2-6
Additional Requirements		
RSM 700	Research Ethics	
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
ATM 651	Introduction to Atmospheric Dynamics	3
ATM 662	Advanced Weather Forecasting	3
EVR 602	Economics of Natural Resources	3
EVR 610	Environmental Planning and the Environmental Impact Statement	3
EVR 616	Ocean Policy	3
EVR 620	Environmental Law and Policy	3
EVR 630	Port Operations and Policy	3
EVR 633	Decision Analysis: Natural Hazards and Catastrophes	3
EVR 677	Management and Conservation of Marine Ecosystems	3
EVR 720	Coastal Law and Policy	3
MBE 615	Tropical Marine Ecology	3
MGS 634	Hydrological Hazards	3
MGS 635	Geological Hazards	3
OCE 624	Applied Data Analysis	3
OCE 651	Applied Ocean Acoustics and Marine Mammals	3
OCE 705	Chemical Oceanography	3
OCE 790	Mechanics and Thermodynamics of the Air-Sea Interface	3

Natural Hazards and Catastrophes Track

Code	Title	Credit Hours
Core Courses (18 credits)		
EVR 633	Decision Analysis: Natural Hazards and Catastrophes	3
EVR 660 & EVR 661	Introduction to Marine Geographic Information Systems and Introduction to Marine Geographic Information Systems - Laboratory	3
MGS 634	Hydrological Hazards	3
MGS 635	Geological Hazards	3
OCE 637	Natural Hazards: Atmosphere and Ocean	3
RSM 612 or EVR 624	Statistics for Marine Scientists Statistics and Data Analysis for Environmental Science and Policy	3
Electives (6 credits)		
The remaining courses may be selected from the following list or other courses approved by the academic advisor. *		
EVR 620	Environmental Law and Policy	3
RSM 613	Statistical Modeling of Extreme and Rare Events	3
Internship ¹		
OCE 805	MPS Internship	2-6
Additional Requirements		

RSM 700	Research Ethics	
Total Credit Hours		30

* Refer to the list of additional elective options.

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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
ATM 651	Introduction to Atmospheric Dynamics	3
ATM 731	Air-Sea Interaction	3
ATM 765	General Circulation of the Atmosphere	3
EVR 610	Environmental Planning and the Environmental Impact Statement	3
EVR 618	Coastal Zone Management	3
EVR 620	Environmental Law and Policy	3
EVR 630	Port Operations and Policy	3
EVR 720	Coastal Law and Policy	3
MGS 614	Geophysics	3
MGS 679	Plate Tectonics	3
OCE 606	Introduction to Ocean Remote Sensing	3
OCE 624	Applied Data Analysis	3
OCE 676	Wave Propagation in the Ocean Environment	3
OCE 721	Waves and Tides I	3
CAE 630	Water Resources Engineering II	3
CAE 660	Sustainable Construction	3
EPH 600	Introduction to the Science Practice of Public Health	3
EPH 612	Global Health	3
EPH 640	Urban Environment and Public Health	3

Suggested Plan of Study

Applied Remote Sensing 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
OCE 603	Physical Oceanography *	3
OCE 608	Introduction to Ocean Systems Engineering *	3
RSM 612	Statistics for Marine Scientists *	3
RSM 700	Research Ethics	0
Credit Hours		12
Spring		
OCE 606	Introduction to Ocean Remote Sensing	3
OCE 707	Advanced Ocean Remote Sensing	3
OCE 637	Natural Hazards: Atmosphere and Ocean *	3
OCE 676	Wave Propagation in the Ocean Environment *	3
Credit Hours		12

Summer		
OCE 805	MPS Internship ¹	2-6
Credit Hours		6
Total Credit Hours		30

* or other approved Elective

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Natural Hazards and Catastrophes Track

Year One		
Fall		Credit Hours
EVR 633	Decision Analysis: Natural Hazards and Catastrophes	3
MGS 635	Geological Hazards	3
RSM 612 or EVR 624	Statistics for Marine Scientists or Statistics and Data Analysis for Environmental Science and Policy	3
EVR 620	Environmental Law and Policy *	3
RSM 700	Research Ethics	0
Credit Hours		12
Spring		
EVR 660 & EVR 661	Introduction to Marine Geographic Information Systems and Introduction to Marine Geographic Information Systems - Laboratory ¹	3
MGS 634	Hydrological Hazards	3
OCE 637	Natural Hazards: Atmosphere and Ocean	3
RSM 613	Statistical Modeling of Extreme and Rare Events *	3
Credit Hours		12
Summer		
OCE 805	MPS Internship ²	2-6
Credit Hours		6
Total Credit Hours		30

* or other approved Elective

¹ Can be taken in Fall or Spring

² 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

Applied Remote Sensing Track

The Applied Remote Sensing (ARS) track, in conjunction with the Center for Southeastern Tropical Advanced Remote Sensing (CSTARS) provides students with theoretical knowledge and practical, real-world experiences geared towards a successful career in the field of remote sensing in both public and private sectors. This program is also appropriate for those already in the workforce who require additional training or are looking to expand upon their knowledge and skills.

Natural Hazards and Catastrophes Track

The mission of the Natural Hazards and Catastrophes (NHC) track is to provide students with the skills and knowledge necessary to understand earth system natural hazards (atmospheric, oceanic, geological, and hydrological) and the data analytics tools required to assess the associated risks. The strategic selection of electives exposes students to legal and regulatory knowledge, communication and media training, and the development of project management skills, all designed to prepare them to address these challenges as future global leaders. The NHC track prepares its students for employment in several sectors, including insurance and re-insurance industry, architecture, emergency management, engineering, public health, and science.

Student Learning Outcomes

Applied Remote Sensing Track

- Students will learn theoretical knowledge and practical skills using a variety of remote sensing instruments to produce, measure, and interpret data from high-resolution satellite images for application to various end-users in the private and public sectors.
- Students will demonstrate professionalism in all aspects of field and lab work during their internships.
- Students will write up a final report and deliver a final presentation based on the work completed in their internship.

Natural Hazards and Catastrophes Track

- Students will understand earth system natural hazards (atmospheric, oceanic, geological, and hydrological) and apply data analytics tools (e.g., statistics, data management, programming, GIS, and remote sensing) required to assess associated risks.
- Students will develop project management skills, understand the legal and regulatory frameworks and regulations, and apply communication and media training to address earth system natural hazards.
- Students will demonstrate professionalism in all aspects of field and lab work during their internships.
- Students will write up a final report and deliver a final presentation based on the work completed in their internship.