MARINE AND ATMOSPHERIC SCIENCE

The Rosenstiel School of Marine and Atmospheric Science (RSMAS) was established in 1943 as the Marine Laboratory of the University of Miami. It has grown from its modest beginnings in a boathouse to be one of the nation's leading institutions for oceanographic and atmospheric research and education.

Originally a tropical marine biological facility, the Marine Laboratory initiated a program of studies leading to the Master of Science degree in 1949. In 1953, laboratory and classroom buildings were constructed on the School's present campus on Virginia Key, and in the late fifties, the Marine Laboratory expanded its staff and developed its oceanographic capabilities in response to the increased interest in scientific research in the United States. It became the Institute of Marine Science in 1961. Ocean-going research vessels were acquired, and additional buildings were constructed to accommodate new wide-ranging projects. In 1969 the Institute, now a School, was named for Dorothy H. and Lewis Rosenstiel in recognition of a major contribution made through the Rosenstiel Foundation to encourage progress in the marine and atmospheric sciences at the University of Miami.

Today, RSMAS has a faculty of 70 scientists who conduct sponsored research while offering graduate studies leading to the Master of Professional Science, Master of Science, and Doctor of Philosophy degrees. The School offers graduate programs in Atmospheric Sciences, Marine Ecosystems and Society, Marine Biology and Ecology, Marine Geosciences, Meteorology and Physical Oceanography, Ocean Engineering, and Ocean Sciences. Undergraduate programs leading to a Bachelor of Science in Marine and Atmospheric Science (with majors in Marine Science, and Meteorology), and a Bachelor of Arts in Marine Affairs are also offered.

RSMAS uses multiple laboratory and high-performance computing facilities and a state-of-the-art catamaran. The Marine Technology and Life Sciences Seawater Complex (MTLSSC), opened in 2014, houses studies that rely on seawater for observing air-sea interactions in a controlled environment and for holding, spawning and rearing marine organisms. This complex is the centerpiece of an updated RSMAS campus. The catamaran, named the F. G. Walton Smith, in honor of the founder of the Rosenstiel School has been in service since 2000. The 96-foot-long catamaran is able to explore the deep ocean as well as normally inaccessible shallow environments such as reefs, mangroves and grassbeds.

Academic Programs

The Rosenstiel School is made up of seven academic programs:

- Atmospheric Sciences (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/atmospheric-sciences)
- Marine Biology and Ecology (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-biology-ecology)
- Marine Ecosystems and Society (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society)
- Marine Geosciences (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-geology-geophysics)
- Meteorology and Physical Oceanography (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/meteorology-physical-oceanography)
- Ocean Engineering (http://bulletin.miami.edu/graduate-academic-programs/engineering/ocean-engineering)
  - The College of Engineering and the Rosenstiel School offer a joint program that leads to a non-thesis M.S. degree in Ocean Engineering.
- Ocean Sciences (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/ocean-sciences)

General Degree Requirements

Master of Professional Science (M.P.S.) Program

The Master of Professional Science (M.P.S.) degree offers many tracks within the departments of Atmospheric Sciences, Marine Biology and Ecology, Marine Ecosystems and Society, and Ocean Sciences. The curriculum is structured to allow students to complete their degree in as little as 12 months (for select tracks), with the training and real-world experience necessary to prepare them for careers in today's professional science job market.

Checklist

All M.P.S. students should follow the M.P.S. Checklist, (http://mps.rsmas.miami.edu/form) which indicates all the milestones that must completed in order to graduate from the Rosenstiel School.

Credit Hour Requirements

M.P.S. students must complete 30 credits of graduate coursework, with a minimum, cumulative GPA of 3.0 to graduate with the M.P.S. degree. These credits are typically distributed as follows: 24 course credits and 6 internship credits. All RSMAS students are required to complete the Research Ethics course (RSM 700).

Academic Advisor and Faculty Mentor/Committee Chair

Students will be assigned an Academic Advisor during their first semester in residence. The advisor must hold an appointment in the program representing each student's track selection. This individual will offer guidance regarding University expectations, coursework, registration, program details, and graduation requirements. At the beginning of the first semester, the student and the Academic Advisor will establish the
curriculum to be followed, based on the student’s personal and professional goals and M.P.S. track enrollment. Each student will also identify and request the involvement of a Faculty Mentor, who will act as the Committee Chair and as a resource to the student regarding career guidance and the selection of an appropriate internship. Track Coordinators typically act as Faculty Mentors/Committee Chairs, but exceptions are permitted. Students should identify their mentor/chair no later than one week after the start of internship.

**Committee**

All M.P.S. students must have a graduate committee of at least 3 members. This committee will include a Committee Chair, who is usually the faculty mentor, an additional faculty member from UM, and one outside committee member, who is usually the direct supervisor at the student’s internship. Each member should be an expert in the student’s chosen track, and more specifically, the topic of their final report. Though deviations from these guidelines are possible, they must be approved by the M.P.S. Dean and Program Director. The Appointment to Student’s Committee form solidifies the committee and is due no later than one week after the start of internship.

**Comprehensive Examination**

A comprehensive examination is required of all M.P.S. students prior to beginning an internship. The exam will be written and will typically be based on core course content. Each program determines the content and form of the examination in a given year-class, according to general school guidelines. In the event of a failure, a student may be re-examined once, upon the advice of the student’s advisor and at the discretion of the graduate faculty of the program. If granted, the re-examination must be given before the end of the following semester. The M.P.S. Office should receive written notification of the results through the Comprehensive Exam form. Students who fail the re-examination are subject to dismissal from the school.

**Internship**

Each student will be required to complete an internship with an organization engaged in some activity associated with marine and/or atmospheric science and identify an Internship Supervisor. Such organizations can be faculty or researchers from accredited universities and laboratories, national or international agencies, private corporations, or foreign governments with clearly defined marine-oriented programs or activities. Internships can be either paid or unpaid by the organization, or interns can complete the internship by formal participation in a university sponsored program or research in some area of marine science. All internships MUST be approved by the student’s committee chair/ faculty mentor. The Internship Commitment Form is due no later than 2 weeks before internship start date. Additionally, a detailed synopsis of a proposed contribution to the hosting organization is required as a formal proposal, due no later than 1 month after internship start date. The internship proposal will include: an introduction to the topic (i.e. a literature review), a statement of the problem, the purpose of the study, methods and materials (i.e. the proposed activities and analyses), a timeline, and plans for disseminating the information. The internship proposal template and guidelines are available on the M.P.S. website. Requirements to engage with an internship host organization:

- Submit the Appointment to Committee form
- Submit the Internship Commitment Form and a one-page summary of the proposed project, highlighting the timeline, goals, expectations, and objectives of your internship
- Complete at least 12 course credits, with a minimum grade point average of 3.0
- Remove all incomplete grades or deficiencies

**Internship Report**

The final grade (Pass/Fail) will be based on a written report and an oral presentation. The internship report is not a summary of involvement but rather a contributory assessment of the experience, including developmental insight and a summary of any research performed. This is the final tangible product of the degree, akin to a M.S. thesis, and should be a coherent, polished document of publishable quality. Copies of the final, approved report should be distributed as follows:

- One electronic copy to each member of your committee
- One copy for the representative agency, institution, or business (electronic and/or hard copy, at their request)
- One electronic copy via e-mail to the M.P.S. Office; signed title sheet may be submitted as a PDF file.

**Oral Presentation**

A strict requirement for the completion of the M.P.S. degree is an oral presentation, preferably offered to the hosting organization. Oral presentations should be no longer than 30 minutes in length, should include a visual component (e.g. PowerPoint), and may not be scheduled until all committee members have edited at least one draft of the internship report. Additionally, the PowerPoint (or equivalent) must be reviewed and edited by your Committee Chair, and all committee members are expected to attend the presentation, either in person or virtually. If you plan to present at RSMAS, please coordinate with your committee to identify a mutually agreeable time and date, and then schedule your presentation with the M.P.S. Office. In order to graduate, you must submit a PDF copy of your presentation to the M.P.S. Office via email.

**Conference Attendance**

Though not mandatory, M.P.S. students are strongly encouraged to attend a scientific conference during their academic residency at RSMAS.

**Graduation**

All M.P.S. students, including joint J.D./M.P.S. students, must submit a graduation request using CaneLink during the semester in which they plan to graduate. All required forms, including the Clearance Form and the final internship report (Certificate of
Master of Science (M.S.) Program

The Master of Science (M.S.) degree is offered in Atmospheric Sciences, Marine Biology and Ecology, Marine Ecosystems and Society, Marine Geosciences, Meteorology and Physical Oceanography, and Ocean Sciences. The expected time to completion for the M.S. degree is two years of full-time study.

Checklist and Academic Plan

Each student should follow the RSMAS Checklist for Defense and Graduation, which will guide the student through all the milestones required in order to graduate from the Rosenstiel School. This begins with an Academic Plan that identifies the number of courses a student must complete to be eligible for graduation according to program requirements. Part I should be reviewed and completed by the student and Program Director during the first semester; Part II must be completed at least one semester before expected graduation.

Credit Hour Requirements

M.S. students are required to take a minimum of 30 credit hours, which consists of 24 graduate course credits (of which 18 must be taken at UM) and 6 research credits, PGM 810 (“PGM” is the program abbreviation). All RSMAS students are required to complete the Research Ethics course (RSM 700).

M.S. students with prior graduate coursework may transfer up to 6 course credits from another accredited institution with the approval of his/her Committee. Students must submit the completed Petition for Transfer of Credit (https://grad.miami.edu/policies-and-forms/forms) form to the RSMAS Graduate Studies Office (GSO) for processing. In no case will credit be transferred until the student has completed an equivalent number of course credits (with grades of “B” or above) at UM.

Any student whose cumulative Grade Point Average (GPA) falls below 3.0 will receive written notice from his/her program with copies to the RSMAS GSO stating that he/she is on academic probation. Any graduate student who receives this warning letter must meet the full standards of academic progress set forth by the University by the end of the subsequent semester. Students who fail to meet the cumulative GPA requirement have failed to meet the satisfactory academic progress standards established by the university and are no longer eligible to receive any graduate assistantship, fellowship or tuition scholarship and are subject to dismissal from the school.

Committee

The “Thesis Committee” described in the UM Graduate Student Handbook (https://grad.miami.edu/policies-and-forms) is commonly known as the student’s “Committee” at RSMAS. Specific requirements for committee formation are provided in the UM Graduate School Handbook (http://grad.miami.edu/policies-and-forms); individual programs may have additional requirements.

Per the UM Graduate School Handbook:

“The committee chair must be Regular Faculty from the student’s program of concentration (this includes secondary appointments). In addition to the chair, one member must be Regular Faculty or have Graduate Faculty (http://grad.miami.edu/graduate-education/graduate-faculty/rsmas) status in the student’s program of concentration. The third member must be an outside member. “Regular Faculty” are faculty having tenured or tenure-earning appointments of a program or department”.

Once the Committee is formed (typically by the end of the first year), the Appointment to Student’s Committee form should be completed, signed by all members and the Program Director, then submitted to GSO. The Committee should meet regularly to review the student’s progress, and prepare a short report on progress and research directions with the student. Proposed changes to the membership of a committee must be approved by the Committee Chair and must carry the endorsement of the Program Director. Approved changes to the Committee must be forwarded to GSO using the Change to Student’s Committee form.

Comprehensive Examination

A comprehensive examination may be required by the end of the first year. Whether or not to host the exam, as well as the required content and format, is at the discretion of each program. The Comprehensive Exam form notifying GSO of the outcome must be submitted by the Committee Chair and approved by the Program Director. In the event of a failure, a student may be re-examined once, upon the advice of the student’s advisor and/or Committee, and at the discretion of the Program Academic Committee with advice from the Comprehensive Exam Committee. If granted, the re-examination must be given before the end of the following semester.

Thesis Proposal and Proposal Defense

The thesis proposal, containing the items listed below, must be defended and approved by the student’s Committee. The purpose of the proposal defense is to certify the readiness of the student to conduct thesis research, as well as facilitate an open discussion regarding the objectives of the thesis and the relevant experimental approach.

1. Tentative title
2. Statement of the problem and objectives
3. Methodology, including equipment and facilities required
The Doctor of Philosophy (Ph.D.) Program

The Doctor of Philosophy (Ph.D.) degree is offered in Atmospheric Sciences, Marine Biology and Ecology, Marine Ecosystems and Society, Marine Geosciences, Meteorology and Physical Oceanography, and Ocean Sciences. The expected time to completion for a Ph.D. degree is five years. A student in residence in the program beyond 8 years requires approval by the Program Director and Associate Dean.

Doctor of Philosophy (Ph.D.) Program

The Doctor of Philosophy (Ph.D.) degree is offered in Atmospheric Sciences, Marine Biology and Ecology, Marine Ecosystems and Society, Marine Geosciences, Meteorology and Physical Oceanography, and Ocean Sciences. The expected time to completion for a Ph.D. degree is five years. A student in residence in the program beyond 8 years requires approval by the Program Director and Associate Dean.

Checklist and Academic Plan

Each student should follow the RSMAS Checklist for Defense and Graduation, which will guide the student through all the milestones required in order to graduate from the Rosenstiel School. This begins with an Academic Plan that identifies the number of courses a student must complete to be eligible for graduation according to program requirements. Part I should be reviewed and completed by the student and Program Director during the first semester; Part II must be completed at least one semester before expected graduation.

Credit Hour Requirements

Each program sets their own requirements with regard to course and research credits, PGM 830 (where “PGM” is the program abbreviation), as stated in the Program Handbook, as long as a minimum of 60 total credits are taken. All RSMAS students are required to complete the Research Ethics course (RSM 700).

It is up to each program to determine, upon admission, whether a transfer student requires more course credits to fulfill the Ph.D. requirements. Ph.D. students entering with a Master’s Degree from another university may transfer up to 24 course credits. Individual programs may require more course credits to remove deficiencies. Of the 36 remaining credits needed for the Ph.D., a minimum of 12 must be taken...
as research credits (PGM 830). Ph.D. students with prior graduate coursework may transfer up to 9 course credits from another accredited institution with the approval of his/her committee. Students must submit the completed Petition for Transfer of Credit (https://grad.miami.edu/policies-and-forms) form to the RSMAS Graduate Studies Office (GSO) for processing. In no case will credit be transferred until the student has completed an equivalent number of course credits (with grades of "B" or above) at UM. In either case, students must complete the Academic Plan form in the first semester in residence if they wish to transfer prior credit.

Any student whose cumulative Grade Point Average (GPA) falls below 3.0 will receive written notice from his/her program with copies to GSO stating that he/she is on academic probation. Any graduate student who receives this warning letter must meet the full standards of academic progress set forth by the University by the end of the subsequent semester. Students who fail to meet the cumulative GPA requirement have failed to meet the satisfactory academic progress standards established by the university and are no longer eligible to receive any graduate assistantship, fellowship or tuition scholarship and are subject to dismissal from the school.

Committee
The “Supervisory Committee” and “Dissertation Committee” described in the UM Graduate Student Handbook (http://www.miami.edu/gs/index.php/graduate_school/helpful_links_resources) are commonly known as the student’s “Committee” at RSMAS, and are normally the same committee. Specific requirements for committee formation are provided in the UM Graduate School Handbook (http://www.miami.edu/gs/index.php/graduate_school/helpful_links_resources); individual programs may have additional requirements.

Per the UM Graduate School Handbook:

“The committee chair must be Regular Faculty from the student’s program of concentration (this includes secondary appointments). In addition to the chair, two members must be Regular Faculty or have Graduate Faculty (http://grad.miami.edu/graduate-education/graduate-faculty/rsmas) status in the student's program of concentration. The fourth member must be an outside member. “Regular Faculty” are faculty having tenured or tenure-earning appointments of a program or department”.

Once the Committee is formed (typically in the second year), the Appointment to Student’s Committee form should be completed, signed by all members and the Program Director, then submitted to GSO. The Committee should meet regularly to review the student’s progress, and prepare a short report on progress and research directions with the student. Proposed changes to the membership of a committee must be approved by the Committee Chair and must carry the endorsement of the Program Director. Approved changes to the Committee must be forwarded to GSO using the Change to Student’s Committee form.

Comprehensive Examination
A comprehensive examination may be required by the end of the first year. Whether or not to host the exam, as well as the required content and format, is at the discretion of each program. The Comprehensive Exam form notifying GSO of the outcome must be submitted by the Committee Chair and approved by the Program Director. In the event of a failure, a student may be re-examined once, upon the advice of the student’s advisor and/or Committee, and at the discretion of the Program Academic Committee with advice from the Comprehensive Exam Committee. If granted, the re-examination must be given before the end of the following semester.

Dissertation Proposal and Proposal Defense
The dissertation proposal, containing the items listed below, must be defended and approved by the student’s Committee. The purpose of the proposal defense is to certify the readiness of the student to conduct dissertation research, as well as facilitate an open discussion regarding the objectives of the dissertation and the relevant experimental approach.

1. Tentative title
2. Statement of the problem and objectives
3. Methodology, including equipment and facilities required
4. Timetable

The Dissertation Proposal form must be approved and signed by the members of the student’s Committee and Program Director. The completed form must be submitted to GSO with the approved copy of the proposal.

Qualifying Examination
The written qualifying examination is normally administered around the time of the proposal defense. In addition, an oral qualifying examination may be required by the program or the student’s Committee. The Committee will prepare and administer the written examination (and oral examination, if required) within the program guidelines. The Qualifying Exam form notifying GSO of the outcome must be submitted by the Committee Chair and approved by the Program Director.

Admission to Candidacy
Before being admitted to candidacy, a student must fulfill the following requirements:

• Have an approved Committee on file
• Pass the comprehensive exam (if applicable)
• Submit and successfully defend the dissertation proposal
• Pass the qualifying exam
• Have a 3.0 average in all credits earned
• Remove all incomplete grades or deficiencies

The application for Admission to Candidacy must be completed with the approval of the Program Director and submitted to GSO at least one semester prior to the expected semester of graduation.

Dissertation Defense
Students must be registered for research credits during the semester of defense. The Announcement of Defense form must be submitted to GSO at least 14 days prior to the defense date. The student is responsible for reserving the room and obtaining approvals from all Committee members and Program Director. Each member must be given no less than 14 days to review material prior to approving the Announcement of Defense. Thus, the student must provide the Committee with a complete version of the dissertation at least 1 month prior to the desired defense date. If a student is receiving a stipend, the Student Payroll End Date form should accompany the Announcement of Defense form. The Committee Chair should notify GSO, in writing, of the outcome of the defense via the Completion of Defense form and SACS Assessment Rubric.

Dissertation Submission
In addition to the regulations in the UM Graduate Student Handbook on submitting the final dissertation and the Graduate School guidelines for the ETD Process, the RSMAS Certificate of Approval form must be signed by all members of the student’s Committee then submitted by the student to GSO at least one day prior to the end of the semester. The Associate Dean of Graduate Studies will sign it prior to delivery to the UM Graduate School.

Defense and Submission Deadlines
The defense and submission deadlines are set by the Graduate School. The defense, formatting review, and completion of final materials must be done by the last day of the semester. If any requirements are not met by the Deadline for Completion, the student is not guaranteed to graduate in that semester and graduation may be deferred to the following semester.

Graduation Clearance
In order to be cleared for graduation, the student must satisfy the minimum degree requirements set by the program, and the Graduate School; fulfill all milestones noted on the RSMAS Checklist for Defense and Graduation; and complete the ETD Process by the identified deadlines. The RSMAS Student Clearance Form must be completed by the student then returned to GSO prior to the last day of the semester.

It is the student’s responsibility to complete the graduation application through CaneLink before deadlines specified on the University Academic Calendar and the UM Graduate School. Students who previously applied for graduation but did not receive the degree must repeat the application process.

Educational Training Program (Teaching Assistants)
RSMAS Ph.D. students are expected to be a Teaching Assistant (TA) for two courses while pursuing their degree. A training session and two teaching opportunities are offered as courses in educational training (RSM 771, RSM 772, RSM 773). The mandatory TA program will include training of new TAs, evaluation of their performance, and recognition of excellence. Faculty nominations for the RSMAS TA Excellence Awards are solicited each semester, and will be given at the end of the academic year.

The goal of the TA program goal is to make the experience as valuable as possible for the TA, the faculty, and the students taking our courses. RSMAS TAs must comply with the following requirements:

• Register for and complete the RSMAS TA training workshop, RSM 771
• Review the TA Resources posted on Blackboard
• Register for the Educational Training courses: RSM 772 and RSM 773
• Refer to the guidelines and course documentation provided with the TA appointment letters

Master of Professional Science (M.P.S.) Programs
The M.P.S. degree prepares students for science careers in industry, government, and non-profit organizations, where employment demands are growing. M.P.S. degrees were developed and implemented nationally in response to employer demands for well-rounded, highly trained employees with a breadth of knowledge and practical skills to address emerging environmental issues and improve the management of natural and cultural resources. The curriculum is structured to allow students to complete their degree in as little as 12 months (for select tracks), with the training and real-world experience necessary to prepare them for careers in today’s professional science job market.

• M.P.S. in Broadcast Meteorology (BME) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/atmospheric-sciences/broadcast-meteorology-mps)
• M.P.S. in Weather Forecasting (WFC) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/atmospheric-sciences/weather-forecasting-mps)
• M.P.S. in Weather, Climate, and Society (WCS) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/atmospheric-sciences/weather-climate-and-society-mps)
• M.P.S. in Tropical Marine Ecosystem Management (TME) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-biology-ecology/tropical-marine-science-mps)
• M.P.S. in Aquaculture (AQU) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/aquaculture-mps)
• M.P.S. in Coastal Zone Management (CZM) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/coastal-zone-management-mps)
• M.P.S. in Exploration Science (ESC) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/exploration-science-mps)
• M.P.S. in Marine Conservation (MCO) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/marine-conservation)
• M.P.S. in Underwater Archaeology (UA) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/underwater-archaeology-mps)
• M.P.S. in Applied Remote Sensing (ARS) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/ocean-sciences/applied-remote-sensing-mps)
• M.P.S. in Natural Hazards and Catastrophes (NHC) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/ocean-sciences/natural-hazards-and-catastrophes-mps)
• B.A./M.P.S. in Marine Ecosystems and Society (MES) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/marine-ecosystems-society-ba-mps)
• J.D./M.P.S. in Marine Ecosystems and Society (MES) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/marine-ecosystems-society-jd-mps)

**Master of Science (M.S.) Programs**

• M.S. in Atmospheric Sciences (ATM) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/atmospheric-sciences/atmospheric-sciences-ms-phd)
• M.S. in Marine Ecosystems and Society (MES) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/marine-ecosystems-society-ms)
• M.S. in Marine Geosciences (MGS) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-geology-geophysics/marine-geology-geophysics-ms)
• M.S. in Meteorology and Physical Oceanography (MPO) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/meteorology-physical-oceanography/meteorology-physical-oceanography-ms)
• M.S. in Ocean Engineering (http://bulletin.miami.edu/graduate-academic-programs/engineering/ocean-engineering)
• M.S. in Ocean Sciences (OCE) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/ocean-sciences/ocean-sciences-ms)

**Doctor of Philosophy (Ph.D.) Programs**

• Ph.D. in Atmospheric Sciences (ATM) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/atmospheric-sciences/atmospheric-sciences-phd)
• Ph.D. in Marine Ecosystems and Society (MES) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-ecosystems-and-society/marine-ecosystems-society-phd)
• Ph.D. in Marine Geosciences (MGS) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/marine-geology-geophysics/marine-geology-geophysics-phd)
• Ph.D. in Meteorology and Physical Oceanography (MPO) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/meteorology-physical-oceanography/meteorology-physical-oceanography-phd)
• Ph.D. in Ocean Sciences (OCE) (http://bulletin.miami.edu/graduate-academic-programs/marine-atmospheric-science/ocean-sciences/ocean-sciences-phd)
RSM 600. Research Diving Techniques. 3 Credit Hours.
This course is designed to introduce students to the practices and policies of scientific diving. The object is to prepare students to use SCUBA as a research tool for the marine sciences. The course content will qualify students as RESEARCH DIVERS under the UM/RSMAS Scientific Diving Program and will meet the standards set by the American Academy of Underwater Sciences (AAUS).

Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

RSM 611. Principles of Mass Spectrometry and Applications to Marine, Atmospheric, and Environmental Science. 3 Credit Hours.
This course goes in depth into the principles and uses of mass spectrometry. It is intended for graduate students who use mass spectrometry to conduct their research. Concepts taught will include the components of mass spectrometers (vacuum systems, ionization methods, mass analyzers, detectors), different types of mass spectrometers and their uses, and coupling chromatography to mass spectrometry. Each student will be required to give presentations on new advances in mass spectrometry and an in-depth presentation on a mass spectrometer that they use and new findings in the literature relevant to their technique and personal research.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 612. Statistics for Environmental Management. 3 Credit Hours.
This course covers the statistical theory, tools, and methods required for management analysis and improvement, emphasizing marine science applications.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

RSM 613. Statistical Modeling of Extreme and Rare Events. 3 Credit Hours.
The course will focus on rare events and extreme values observed in nature. In particular, students will learn: advanced statistical methods of data analysis, as well as concepts of probability and predictability; statistical modeling of rare and extreme events; and applications of these advanced techniques to real atmospheric and oceanic data.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 620. Climate and Society. 3 Credit Hours.
This course is designed to provide students from different disciplinary backgrounds with an overview of physical processes, general concepts and policy debates surrounding climate issues.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 621. Object-Oriented Programming and Agent-Based Modelling. 3 Credit Hours.
Hands-on training in object-oriented programming using Java, including Java statistical packages, and in the development of agent-based and individual-based simulation models for ecological, physiological, social, economic and physical sciences. Course includes introductions to cellular automatons and models based on social and behavioral networks. No prior programming experience required.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 622. Data Management for Scientists. 2 Credit Hours.
This course will cover techniques used in data profiling, filtering, and archiving. Online tools will be used for elaborating data management plans and well-established database techniques for manipulating data. Participants will develop data management plans and introduce techniques for data manipulation, such as database design and implementation concepts, query coding, and data cleaning/importing/exporting. Course participants will be exposed to theoretical concepts and engage in hands-on activities throughout the semester. Participants are encouraged to bring their own data for processing or asked to select a dataset from the many online data repositories.

Components: LEC.
Grading: SUS.
Typically Offered: Fall.

RSM 646. Presentation Bootcamp. 1 Credit Hour.
This course focuses on presenting scientific concepts and research findings more effectively to both scientific/technical audiences and the general public.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.
RSM 647. Methods for Marine and Atmospheric Education. 3 Credit Hours.
Will introduce students to recent national science and engineering, climate, ocean education standards, and best curricula and instructional approaches for teaching and learning science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

RSM 648. Management and Leadership in Marine and Atmospheric Science. 3 Credit Hours.
The goal of this course is to become an effective leader/manager while leveraging the individual strengths of a team in the marine and atmospheric field. The course will use leadership theories and case studies to understand how decisions affect outcomes. Students will develop the ability to manage teams effectively amidst a changing world. Students discuss literature and case studies to explore the foundations of effective leadership and support task triage, decision-making, shared mental models, and appropriate executive styles. The course will introduce students to recent national science and engineering, climate, and ocean standards and best approaches when it comes to managing a staff in the marine and atmospheric sciences. The course will also focus on identifying and analyzing marine and atmospheric leadership and effectively communicating scientific topics to different audiences.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 650. Data Management in the Research Environment. 2 Credit Hours.
This course covers theoretical and practical approaches to research data management in academic contexts. Theoretical aspects include overviews of information science, data policy and data governance. The practical approaches include skills and best practices in research data management, and basic command line computing for data analysis and visualization (python and R). The purpose of the course is to increase research productivity, to enable data stewardship, and to help the student exceed data management expectations/requirements in the research environment. This is a practical methods course with tangible products; students produce a data management plan for their specific research endeavor, or prepare and deposit data into a discipline specific repository (other projects subject to instructor approval will be considered). The class is open to all graduate students in all disciplines. There are no prerequisites and while the course is designed for the first or second year of a graduate program, students who are further along will benefit as well.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

RSM 660. Investigating Nature through Science Teacher Active Research (INSTAR) in Physical Science. 2 Credit Hours.
This is a graduate level marine science course that provides a hands-on approach to education focused on geological and meteorological research in South Florida environment. The course provides training in marine science content, field techniques, state-of-the-art field, computer technology, and science educational reform measures. Participants work collaboratively with marine and atmospheric scientists to bring cutting edge marine science content and research to the classroom focusing on the following coastal themes: geology, hydrology and meteorology. The course will be applicable to all graduate and qualified undergraduate marine science students, per-service teachers in colleges of education, and in-service teachers in school systems throughout the country.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

RSM 661. INSTAR for Physical Sciences Follow-up. 1 Credit Hour.
This is a follow-up course for participants in MGG 560 and is designed to test the application of the methods learned in MGG 560 to the teaching of high school students. Participants are expected to show evidence of teaching material learned in MGG 560.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

RSM 662. Investigating Nature through Science Teacher Active Research in Biological Science. 2 Credit Hours.
This is a graduate level marine science course that provides a hands-on approach to education focused on marine science research and technology in South Florida coastal environments. The course provides training in marine science content, field techniques, state-of-the-art field and computer technology, and science educational reform measures. Participants work collaboratively with marine scientists to bring cutting edge marine science content and research to the classroom focusing on the following coastal themes: coral reefs and marine fisheries. The course will be applicable to all graduate and qualified undergraduate marine science students, per-service teachers in colleges of education, and in-service teachers in school systems throughout the country.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.
RSM 663. INSTAR Biological Sciences Follow-up. 1 Credit Hour.  
This is a follow-up course for participants in RSM 562 and is designed to test the application of the methods learned in RSM 562 to the teaching of high school students. Participants are expected to show evidence of teaching material learned in RSM 562.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Summer.

RSM 665. Fish Ecology and Oceanography. 3 Credit Hours.  
This course is intended to introduce students to key biological, ecological, oceanographic, and climatic processes of direct relevance to fishery species, with a view toward development of an ecosystem perspective.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Fall.

RSM 666. Polar Science. 3 Credit Hours.  
The course covers the physical, chemical and biological components of the polar oceans, atmosphere and coastal regions. The interactions between ocean, ice, atmosphere and land are discussed in detail not only in terms of local relationships, with links to the climate system.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Offered by Announcement Only.

RSM 667. Motorboat Operator Certificate Course. 1-2 Credit Hours.  
The MOCC course was developed and formalized by the United States Department of the Interior in the early 1990’s. The course is designed to give students broad academic knowledge and practical training running small boats (Boats 26’ in length or shorter). In addition to the relevant theory, students will get hands on training trailering small boats, launching and loading at boat ramps, slow and high speed maneuvering, Marline Spike (knot tying), as well as in water emergency training and the use of flares and pyrotechnics. The MOCC certification is the training standard for occupational small boating and used by government organizations, public and private research organizations, public aquaria, etc. The certification is a marketable skill for students moving ahead in their careers in marine science.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Fall, Spring, & Summer.

RSM 668. Techniques in Respirometry, Swim Performance and Behavior of Aquatic Organisms. 2 Credit Hours.  
The objectives of this course is to give participants an understanding and overview of methods and hands-on with modern equipment. The emphasis of the course will be on marine fish, but the techniques can be used for freshwater fish and aquatic invertebrates as well. The course is based on lectures, lab exercises and plenary discussions. The final part of the course constitutes a written project based on data collected during the week.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.

RSM 670. Carbon and Climate. 3 Credit Hours.  
This course is designed to **provide students from different disciplinary backgrounds with an overview of the underlying processes, concepts, and policy debates surrounding the issue of carbon emissions and climate change. Individual faculty from RSMAS and elsewhere will lecture on cutting-edge research areas. Topics covered include: climate modeling; and climate policy.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Offered by Announcement Only.

RSM 671. Special Topics. 1-4 Credit Hours.  
Lectures and research projects in special topics related to Marine and Atmospheric Science.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Fall, Spring, & Summer.

RSM 672. Special Topics. 1-4 Credit Hours.  
Lectures and research projects in special topics related to Marine and Atmospheric Science.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Fall, Spring, & Summer.

RSM 673. Special Topics. 1-3 Credit Hours.  
Lectures and research projects in special topics related to Marine and Atmospheric Science.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Fall, Spring, & Summer.
RSM 674. Special Topics. 1-3 Credit Hours.
Lectures and research projects in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 675. Special Topics. 1-3 Credit Hours.
Lectures and research projects in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 676. Special Topics. 1-4 Credit Hours.
Lectures and research projects in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 677. Special Topics. 1-4 Credit Hours.
Lectures and research projects in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 678. Special Topics. 1-4 Credit Hours.
Lectures and research projects in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 700. Research Ethics. 0 Credit Hours.
The NIH Guide for Grants and Contracts stipulates that Institutions receiving support for National Research Service Award Training Grants are required to develop a program in the principles of Scientific Integrity. The University of Miami Rosenstiel School has chosen to respond to this requirement with this course. This course must be taken during the first semester in the Department or Program. This is a six-hour course and will be given in two sessions of three hours each.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

RSM 710. The Physical Environment of Marine Organisms. 3 Credit Hours.
The fluid environment of the sea influences the growth, distribution, and survival of marine organisms. The physical processes that affect organisms occur in space and time, ranging from the molecular properties of water to basin-wide linkages between oceanic regime and climate shifts are discussed. Course emphasis is placed on how physical processes affect the life of plankton to nekton, Students are required to present reviews based on the literature.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 720. Object-oriented Programming and Agent-based Modeling. 3 Credit Hours.
Basics of object-oriented programming using Java, including Java statistical packages, and hands-on development of agent-based simulation models for social, economic, biological and physical sciences. Includes introductions to automaton and individual-based models.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

RSM 771. Educational Training 1. 0 Credit Hours.
Educational training workshop and presentations.
Components: WKS.
Grading: SUS.
Typically Offered: Fall & Spring.

RSM 772. Educational Training 2. 0 Credit Hours.
First semester of educational training.
Components: WKS.
Grading: SUS.
Typically Offered: Fall & Spring.
RSM 773. Educational Training. 3.0 Credit Hours.
Second semester of educational training.
Components: WKS.
Grading: SUS.
Typically Offered: Fall & Spring.

RSM 774. Advanced Studies. 1-3 Credit Hours.
Supervised study in areas of special interest to graduate students.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 775. Advanced Studies. 1-3 Credit Hours.
Supervised study in areas of special interest to graduate students.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 780. Directed Readings. 1-3 Credit Hours.
Directed readings in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

RSM 781. Directed Readings. 1-3 Credit Hours.
Directed readings in special topics related to Marine and Atmospheric Science.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.