

# M.S. IN OCEAN ENGINEERING

## Overview

The MS in Ocean Engineering provides participants with a combination of engineering skills and strong scientific knowledge in the marine sciences, preparing them to address a variety of ocean-related engineering concerns (e.g. prepare coastal communities for a changing climate; port and harbor security; coastal observation networks; coastal infrastructure; etc.) in a rational and responsible manner.

The program is open to students who want to pursue a career in engineering or marine science and professionals who have responsibilities in engineering, marine science, business and law fields and want to further their knowledge and skills. According to the U.S. Bureau of Labor Statistics, Ocean Engineering is projected to grow 9% from 2014-2024.

The program has two tracks:

Coastal engineering

Remote sensing and maritime security

Both tracks build upon the unique world-class resources available through the University of Miami's Center for Southeastern Tropical Advanced Remote Sensing (<https://www.cstars.miami.edu/>) (CSTARS) satellite receiving facility and Surge Structure Atmosphere Interaction Facility (<http://sustain.rsmas.miami.edu/>) (SUSTAIN) wind-wave laboratory.

## Curriculum Requirements

The curriculum is divided into three groups. The first group of four core courses (12 cr) provides an introduction to the field, as well as analytical tools and theoretical background in the fundamental areas of fluid dynamics and wave propagation.

**Requirement for those students entering this program without an engineering background are three terms of Calculus, Ordinary Differential Equations, Physics II, Statics and Dynamics.**

The initial semester of the program is designed to introduce students to the different subjects encompassed within modern Ocean Engineering and to provide the fundamental knowledge in oceanic applications of mathematics and fluid mechanics necessary to excel in the later courses.

The student then elects one course (3 cr) from a group focusing on computational (numerical) methods and one course (3cr) from a group focusing on experimental methods. These courses give the student the additional tools needed in the profession.

Code	Title	Credit Hours
MAE 612 or OCE 675	Intermediate Fluid Mechanics Fluid Mechanics	3
OCE 608	Introduction to Ocean Systems Engineering	3
OCE 676	Wave Propagation in the Ocean Environment	3
OCE 701	Mathematical Methods in Marine Physics	3
<b>Choose one from the following:</b>		<b>3</b>
MAE 714	Computational Fluid Dynamics	
MPO 762	Computer Models in Fluid Dynamics	
MPO 764	Atmospheric and Oceanic Turbulence	
<b>Choose one from the following:</b>		<b>3</b>
OCE 631	Ocean Data Analysis	
ECE 738	Computer Vision	
MPO 764	Atmospheric and Oceanic Turbulence	
MAE 706	Experimental Methods in Fluid Mechanics	
Electives <sup>1</sup>		12
<b>Total Credit Hours</b>		<b>30</b>

<sup>1</sup> Electives should be chosen based on the intended track of study:

- Track A: Coastal Engineering
- Track B: Remote Sensing and Maritime Security

## **Mission**

The mission of the MS Ocean Engineering degree is to educate students with a combination of strong applied scientific knowledge in the marine sciences and engineering. These students will possess the skills needed to address a range of marine related concerns in a rational and responsible manner.

## **Goals**

Within this context, the objective of the MSOE program is to educate and train students who, upon completion of their degree, are prepared to assume positions in industry, government, academic, and non-governmental institutions that require advanced scientific training and engineering skills in the fields of Applied Remote Sensing and coastal/ocean engineering.

## **Student Learning Outcomes**

- Students will demonstrate competency in applying the applied scientific and engineering knowledge required for employment in the broad field of ocean engineering in the industrial or governmental sector.
- Students will demonstrate oral and written communication skills required for employment in the broad field of ocean engineering in the industrial or governmental sector.