

# SYLLABUS

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## GENERAL INFORMATION

Course prefix & number:	<b>BIO 665</b>
Course Title:	<b>Advanced Study: Research Methods on SCUBA</b>
Credit Hours:	<b>3 semester hours</b>
Instructor:	<b>Arthur W. Mitchell, Adjunct Faculty</b> <b>MarineLab Staff as Teaching Assistants</b>
Contact Information:	<b>Ginette Hughes, Senior Vice President</b> <b>(800) 741-1139 or ginettehughes@mrdf.org</b>

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## COURSE DESCRIPTION

This course is geared towards science teachers who are looking to increase their knowledge and understanding of research methodologies used to study the coral reef ecosystem. Participants will spend six days at a marine education center in Key Largo, Florida. Instruction in a variety of research methodologies, including that used by Reef Check, will be followed by several data-gathering expeditions on SCUBA. The ecology and biology of the coral reef ecosystem, and current efforts to restore specific reef sites, will also be discussed. The data gathered will be compiled and submitted to various organizations for use in ongoing research.

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## LEARNING OUTCOMES:

Upon completion of this component, participants will:

1. Describe the environmental conditions necessary for a healthy coral reef and the common threats (natural and anthropogenic) compromising these conditions in the Florida Keys.
2. Describe the basic coral polyp structure and its colonization. Include the two major types of coral found in the Keys and examples of species of both types.
3. Identify and describe examples of competition between species that commonly occur at the coral reef.
4. Demonstrate and participate in commonly used marine ecosystem survey methods and techniques.
5. Demonstrate the ability to successfully identify common reef fish species in the Florida Keys.
6. Participate in several reef fish surveys to contribute to the Reef Environmental Education Foundation database.
7. Participate in a plankton tow and identify phytoplankton, zooplankton, meroplankton and holoplankton with the aid of a dissecting microscope.
8. Identify the major threats to the survival of the coral reef (both natural and anthropogenic) as well as the corresponding restoration efforts being implemented in response to these threats.

9. List and describe the major adaptations of the three mangrove species found in Florida which allow them to thrive in a marine environment.
10. Describe the relationship between the major marine ecosystems in the Keys and how each habitat's stability is dependent on the health of the others.
11. Demonstrate proper identification of common coral diseases, coral bleaching, and damage to corals caused by boat propellers.
12. Understand data entry techniques used in marine research and demonstrate their usage.
13. List and describe three examples of major boat groundings on the reef and the resulting damage in local Keys waters.
14. Demonstrate ability to identify common invertebrate phyla and species found at the coral reef.
15. Differentiate between passive and active habitat restoration and provide examples of each that are used in Florida Keys' habitats.
16. Identify major differences between nocturnal and diurnal communities at the coral reef.
17. Derive a definition for the term "ecology".
18. Describe a mutualistic symbiotic relationship necessary for coral survival.

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## **TEXTBOOK**

The course includes a binder with various handouts and publications, derived from several different sources. No other textbook is required.

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## **TEACHING METHODOLOGY**

The course uses discussions and lectures to introduce core concepts and the marine community, followed by field trips to various sites in John Pennekamp Coral Reef State Park, Everglades National Park, and the Florida Keys National Marine Sanctuary. Participants SCUBA dive and observe first hand the ecological communities. Worksheets with vocabulary and concepts are used for review, and a written final exam is used to test their knowledge acquisition. In addition, a pre- and post-test is administered to evaluate effectiveness of methodology. A Fish Count test will also be administered through the Reef Environmental Education Foundation and will determine participants' ability to contribute to the REEF fish survey database.

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## **PREREQUISITES**

Bachelor's degree in science or education

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## **PARTICIPATION**

Participation in all discussions, lab activities, and field trips is REQUIRED and is 50% of the grade.

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**GRADE COMPONENTS**

Participation in all aspects of the program: 50%  
Written final exam: 50%

Grading: A (90-100%), B (80-90%), C (70-79%), D (60-69%), F (<60%)

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**COURSE CALENDAR**

<b>DAY</b>	<b>TIME</b>	<b>ACTIVITY</b>
<b>Sun</b>	<b>4:00 PM</b>	<b>Orientation, Advanced Coral Reef Ecology discussion</b>
<b>Mon</b>	<b>AM</b>	<b>Skills check out dive, Introduction to Marine Ecology Field Methods, Fish Count prep discussion, Field training session on survey methods</b>
	<b>PM</b>	<b>SCUBA Reef survey site #1</b>
	<b>EVE</b>	<b>Reef invertebrates discussion, plankton biology activity</b>
<b>Tue</b>	<b>AM</b>	<b>SCUBA Reef survey site #2 &amp; observation dive</b>
	<b>PM</b>	<b>SCUBA Reef survey site #3 &amp; observation dive</b>
	<b>EVE</b>	<b>Fish Count test</b>
<b>Wed</b>	<b>AM</b>	<b>Mangrove ecology field trip</b>
	<b>PM</b>	<b>Mini Adventure in Underwater Habitats (SCUBA)</b>
	<b>EVE</b>	<b>Night Dive (SCUBA)</b>
<b>Thur</b>	<b>AM</b>	<b>Fish Count dives (SCUBA)</b>
	<b>PM</b>	<b>Fish Count dives (SCUBA)</b>
	<b>EVE</b>	<b>Data summaries and upload</b>
<b>Fri</b>	<b>AM</b>	<b>Hardbottom shoal ecology field trip</b>
	<b>PM</b>	<b>Post test, evaluations, FINAL EXAM</b>

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