

SYLLABUS

GENERAL INFORMATION

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| Course prefix & number: | BIO 545 |
| Course Title: | Advanced Study: Coastal Marine Ecology of Key Largo |
| Credit Hours: | 3 semester hours |
| Instructor: | Arthur W. Mitchell, Adjunct Faculty MarineLab Staff as Teaching Assistants |
| Contact Information: | Ginette Hughes, Senior Vice President (800) 741-1139 or ginettehughes@mrdf.org |

COURSE DESCRIPTION

This course is geared towards science teachers who are looking to increase their knowledge and understanding of marine ecosystems. Participants will spend seven days at a marine education center in Key Largo, Florida. Ecology discussions and laboratory activities in the evening will be followed by field trips to various ecological communities in the Key Largo coastal marine environment. Participants will snorkel each environment, exploring the abiotic parameters which define each habitat (illustrated in the Florida Keys) and the community diversity of each habitat.

LEARNING OUTCOMES:

Upon completion of this component, participants will:

1. Derive a definition for the term "ecology."
 2. Identify and explain the climactic transition influencing the Keys' ecosystems.
 3. Describe four edges or ecotones found in the Florida Keys and the mutual influences among these neighboring habitats.
 4. Understand the concept of "abiotic factor" and
 - a. estimate realistic values for five marine aquatic parameters
 - b. define, explain the abiotic prerequisites for three different habitats
 5. Understand the geography and geology of the Florida Keys.
 6. Describe the life cycle of a marine organism and identify culturing techniques which are crucial to the successful completion of this cycle in an artificial environment.
 7. Illustrate the concept of metamorphosis with five examples from the marine environment.
 8. Identify six representative autotrophs and six representative heterotrophs characteristic of each of six different coastal communities.
 9. Understand the concepts of diversity and abundance of population and predict their response to stress vs. stability.
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10. Explain six benefits to the human population of the Keys that are contributed by healthy coastal habitats.
11. Participate in a plankton tow and identify phytoplankton, zooplankton, meroplankton and holoplankton with the aid of a dissecting microscope.
12. Differentiate and cite two examples each of meroplankton and holoplankton.
13. Demonstrate an understanding of limiting factors that affect populations in coastal habitats.
14. List characteristics which define each of the six major invertebrate phyla.
15. Understand the techniques used for evaluating water quality and demonstrate the operation of instruments for these measurements.
16. Explain, and rank order by effectiveness, characteristics utilized for the field identification of coral reef fishes.
17. Make a firsthand exploration of five different coastal habitats in the Florida Keys.
18. Explain the mutualistic relationship that allows corals to develop in an oligotrophic environment.
19. List five relationships between two organisms that are characteristic of the Florida Keys coastal environment.

TEXTBOOK

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

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 snorkel 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.

PREREQUISITES

Bachelor's degree in science or education

PARTICIPATION

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

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%)

COURSE CALENDAR

| DAY | TIME | ACTIVITY |
|------|------------|---|
| Sun | 4:00 PM | Orientation, Introduction to Keys Habitats |
| Mon | AM | Snorkeling orientation |
| | PM | Seagrass ecology discussion & field trip |
| | EVE | <i>Cassiopeia</i> culture, plankton biology activity |
| Tue | AM | Mangrove ecology field trip |
| | PM | Coralline algae zonation community field trip |
| | EVE | Coral reef ecology discussion, invertebrate diversity lab |
| Wed | AM | Coral reef ecology field trip |
| | PM | Hardbottom shoal ecology field trip |
| | EVE | Sponge spicule identification lab, field identification of reef fish discussion |
| Thur | AM | Coral reef ecology field trip with fish count |
| | PM | Reef Restoration techniques discussion Summary |
| | EVE | Backcountry Everglades field trip |
| Fri | AM | Coral reef restoration field trip |
| | PM | Post test, evaluation, final exam |