



## **Tropical Marine Research Techniques Reef Fish Monitoring Course**

This course is developed for credit recommendation through a student's home institution for two semester hours at the 300 level in the Biological Sciences.

Students should present this course syllabus to their advisors before course participation in order to arrange for any credit opportunities for the student and course evaluation.

Additional requirements may be added to the course by the home institution such as a personal research paper or project and Odyssey Expeditions will assist the student in accomplishing these goals during a voyage, please submit proposals before May 15 for any projects so that we can ensure availability of resources and feasibility of the study.

### **Tropical Marine Research Techniques: Reef Fish Monitoring Syllabus**

#### **Lead Instructor**

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#### **Course Development**

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Note: students are required to be Open Water Scuba Certified to participate in this course.

#### **Textbooks**

An Introduction to the Biology of Marine Life. J.L. Sumich  
Reef Fish Identification, Florida, Caribbean and Bahamas. P. Humann and N. DeLoach  
Reef Fish Behavior, Florida, Caribbean, Bahamas. N. DeLoach

In addition, this course will use a variety of on-line sources of information.

## **Course Content: Distance Delivery**

Before the voyage you should read the following information. Articles noted with (EoE) are from the Encyclopedia of the Earth (<http://www.eoearth.org/>).

### **1) Marine Biology**

- [Water](#)
  - [Physical properties of water](#) (EoE)
  - [Seawater](#) (EoE)
  
- [Ocean](#) (EoE)
  - [Ocean circulation](#) (EoE)
  - [Caribbean Sea large marine ecosystem](#) (EoE)
  - Caribbean Sea  
<http://www.britannica.com/eb/article-9109730/Caribbean-Sea>
  
- [Marine biomes](#) (EoE)
  - Differences between terrestrial and aquatic environments (EoE)
  - Tropical marine biomes
    - Coral reef (EoE)
      - [Coral reef zonation](#) (EoE)
  - [Seagrass meadows](#) (EoE)
    - [Aquatic plants](#) (EoE)
  - [Mangrove swamp](#) (EoE)
    - [Lesser Antillean mangroves](#) (EoE)

### **2) Biodiversity (EoE)**

- Organismal diversity- powerpoint
- Fish
  - [Quick Course in Ichthyology](http://www.marinebiology.org/science.htm) <http://www.marinebiology.org/science.htm>
  - [Coral reef fish foraging behavior in the Caribbean](#) (EoE)

\*\* [“The Ecology of Coral Reef Fishes”](#) contains interesting supplemental information about fish ecology. (this is not required reading, but it is pretty cool!)

- [Marine biodiversity](#) (EoE)
  - [Global marine biodiversity trends](#) (EoE)
  - [Marine biodiversity and food security](#) (EoE)

### **3) Environmental Issues**

- [Fisheries and aquaculture](#) (EoE)
  - [Marine fisheries](#) (EoE)
  - [Economics of fisheries](#) (EoE)
- [Threats to coral reefs](#) (EoE)
  - [Coral reefs and climate change](#) (EoE)
  - [Coral degradation through destructive fishing practices](#) (EoE)
- [Marine ecosystem services](#) (EoE)
- [Marine reserves](#) (EoE)

#### 4) Fish ID

- You will be ahead of the game if you spend some time learning the fish of the Caribbean before the voyage. The REEF website has a gallery containing 30 of the most common fish in the region. You can quiz yourself at their website.
- [Caribbean Fish ID](#) -
- [Caribbean Fish ID Quiz](#) -

#### **Course Content: Face to Face delivery**

- Introduction to diving skills necessary to perform reef fish monitoring
- PADI Advanced Open Water Certification (earned on board)
- Introduction to REEF Fish Monitoring Protocols
- Fish ID

#### **Course Content: Field Activities**

- Fish ID
- Conduct Fish Monitoring Dives using REEF protocols

#### **Service Learning Component**

- Students will collect data for use by the environmental conservation and education organizations Reef Check Foundation and the Reef Environmental Education Foundation.
- Ideally, we will monitor sites within and adjacent to Marine Protected Areas (MPAs) so data will be made available to the MPAs as well.
- Students will participate in a sea turtle reintroduction project in Bequia.
- Students will participate in reflective writing assignments before, during, and after the voyage and in group discussions.

#### **Grading**

- |  |     |
|--|-----|
| • Knowledge Reviews                        | 20% |
| • Participation in Reef Fish Monitoring    | 30% |
| • Participation in other voyage activities | 20% |
| • Final Assignment (due after the voyage)  | 30% |

#### **Expected Learning Outcomes**

By the end of the course, a fully-engaged student should be able to:

- Discuss areas of the biology and ecology of coral reef fishes and reef fish related environmental issues.
- Dive in a safe and environmentally responsible manner with sufficient buoyancy control to be able to conduct monitoring dives.
- Identify specified coral reef fishes to species.
- Conduct all aspects of coral reef monitoring dives following the REEF protocol.
- Discuss the importance of long term data for people making decisions about environmental issues and the role that the general public, NGOs, governmental agencies, and scientists play in the conservation of marine habitats.

## **Methods for Assessing the Expected Learning Outcomes.**

The expected learning outcomes will be assessed through the students performance:

- on written assignments.
- on species ID tests both in the lab and field.
- on training, research, and recreational scuba dives.
- on reflective writing exercises conducted before, during, and after the voyage.
- in group discussions (reviewing lecture material, service learning component) during the voyage.
- in all phases of conducting REEF coral reef fish monitoring surveys and other projects.

## **Additional Information**

### **1) Here is some info about the places that you will be visiting**

Caribbean Islands

- [St Lucia](#)
- [St Vincent and the Grenadines](#)
- [Martinique](#)

Terrestrial Ecology of the Islands

- Biological diversity in the Caribbean Islands (EoE)
- Windward Islands dry forests (EoE)
- Windward Islands moist forests (EoE)
- Windward Islands xeric scrub (EoE)
- Pitons Management Area, Saint Lucia (EoE)

### **2) Careers in Marine Biology**

- [Becoming a marine biologist](#)
- [Becoming a marine biologist: steps to have a research career in ocean science](#)
- [So you want to be a marine biologist?](#)

## **Tentative Schedule**

### **Prior to Voyage**

Students read distance learning materials and answer review questions at the end of each lesson.

### **On the Voyage**

#### **Days 1 – 7**

Initiate Dive Training

- check out dive
- Advanced Open Water course (knowledge review and in-water)

Discuss Review Questions

Introduce REEF sampling protocol

Fish ID

#### **Days 7 – 14**

Complete dive training (Specialty Courses)

Continue to discuss review questions

Continue to learn fish species

Service learning group discussions

Conduct REEF Fish surveys

#### **Days 14 – 21**

Complete discussion of review questions

Service learning group discussions

Conduct REEF fish surveys

### **After the Voyage**

Final assignments are due by September 15th