Field Studies in Marine Biology: A Study Abroad Course

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Text: "A Primer of Ecological Statistics", 2nd Edition, Gotelli & Ellison, Sinauer Assoc. Pub

Course Objectives & Overview

The objective of this course is to train students in conducting science in marine biology from an *in situ* perspective - that is, in the field. Through lectures, discussions of the scientific primary literature, and field trips student will become familiar with tropical marine habitats and organisms unlike those available for study on campus. In addition, students will be trained in basic experimental design, statistical analyses, and common quantitative ecological field techniques useful in addressing scientific questions in marine biology. Students will also gain practical experience by working in groups on independent field projects whose findings will be reported in written and video documentary reports. Interactions with Belizians at the laboratory and an outreach teaching project at a primary school in Belizian village will also instill in students a better appreciation of other cultures as well as the challenges that developing countries face in managing and protecting marine environments.

The course begins with a series of on-campus lectures on experimental design, statistical and field methods, identification of Caribbean marine organisms, and the biology of the marine environments to be visited. Then the class travels together to a marine laboratory on an isolated island in Belize where we will spend the next two weeks. There, we will begin each morning with a briefing of the days activities followed by field work (AM), lunch, more field work (PM) and finally dinner, after which there will either be a lecture, discussion of scientific papers, or free time. Upon return from the study abroad trip, the class will meet to go over independent project tasks and then students will have several weeks to complete the data analyses, literature review, and preparations for their written and video presentations to be given to the class on the last day of the course.

Course Text

The textbook for this course is "A Primer of Ecological Statistics", 2nd Edition, Gotelli & Ellison, Sinauer Associates, Inc. Publishers. It is NOT available at the ODU Bookstore (too expensive), but you can obtain a copy in one of two ways depending on your needs:

(1) Paperback: If you want a textbook on ecological statistics and experimental design to keep, you can order the textbook online directly from Sinauer Publishers at a reduced price ($46.71) and free shipping. To order go to: http://www.sinauer.com

(2) Ebook: If you would like to download the textbook electronically for use on your computer and you only want it available for 180 days (the ebook is a short-term description), then you can do so for $24.73. Again, to order go to: http://www.sinauer.com

Course Grading

The final grade for this course will be determined from exams, class-based laboratory reports, and the independent project written, oral, and video reports. The grading breakdown is as follows:

Organism ID Exam:	10%
Class Laboratory Report I: Seagrass	15%
Class Laboratory Report II: Coral Reef	15%
Independent Project Written Report:	40%
Independent Project Video Report:	20%

Exams

Lab Exam: This will take place during the field trip and will be a field-based organism identification exam, wherein we will snorkel through different marine environments while I point out organisms that you must then identify by scientific name on underwater data sheets.

Lab Reports

Class Laboratory Reports: Students will work together in the field in teams of two and then will write up their team's laboratory reports for two field studies that we will do together as a class. The details about these studies will be provided later. The individual reports will be submitted electronically, will generally be 3-5 pages in length, and should address the questions or hypotheses posed in each homework handout or generated during our class discussions. Reports will also be evaluated based on grammer and spelling. I will give you due dates for these reports later.

Independent Project Report: Students will work together in groups of two on an approved independent project and the group will submit a single written research report and a 5 - 10 min long video documentary on their research.

Written Report: The format of the written report should follow that of the journal ***Marine Ecology Progress Series*** (see their website for detailed information about the journal and instructions to authors: www.int-res.com/journals/meps). In brief, the written reports will generally be 10-20 pages in length and must follow the standard format for scientific papers: Abstract, Introduction, Methods, Results, Discussion, and Literature Cited. The ***Abstract*** summarizes the entire report in a brief (~ 250 words) paragraph covering the objectives, methods, results, and implications of the study. At the bottom of the Abstract you should provide key words and phrases useful for electronic search engines. The ***Introduction*** should summarize the objectives and necessary background information and literature. The ***Methods*** section should describe the location and methods employed in sufficient detail that someone else could duplicate the study. The ***Results*** section should include a verbal, statistical, and graphical description of the data. The ***Discussion*** section should focus on your interpretation of what the data indicate – that is, the biological implications of your results. Finally, you should include a ***Literature Cited*** section where all of the literature resources you cite within the rest of the paper are listed alphabetically. The majority of these citations should be from the primary scientific literature – not from books, the internet, or technical bulletins. This report will be due the last day of class.

Video Report: Each student group will be loaned a GoPro Hero camera for their use to obtain images (still or video) of their independent project. The GoPro Hero camera can be used on land or underwater, takes high-definition still and video images, and is capable of time-lapse and low-light recordings along with sound. Computing software will then be used to edit and produce a short documentary film (5 - 10 min in length) suitable for a knowlegible but non-scientific audience. The film's goal is to explain in a creative, entertaining, yet informative way the importance and results of their independent project.

Tentative Course Schedule

AT ODU: 3 hrs Daily		
Day	**Format**	**Activity**
1	Lecture	Course Administration & Trip Logistics Overview of Caribbean Marine Habitats
2	Lecture	Overview of Caribbean Marine Organisms Descriptive Statistics Review
3	Lecture	Introduction to Experimental Design
4	Lecture	Coral Reef Monitoring Methods

Tentative Course Schedule (continued)

AT STUDY ABROAD SITE		
1	AM/PM	Travel Day: Norfolk - Belize City - South Water Caye
	EVENING	Lecture: Welcome & Introduction to IZE
2	AM	Field trip: snorkeling instruction & practice
	PM	Field trip: coral reef habitat & seagrass habitat
	EVENING	Lecture/Scientific Paper Discussion & Free Time
3	AM	Field trip: mangrove habitat
	PM	Field Trip: Coral Reef Dive
	EVENING	Lecture/Scientific Paper Discussion & Free Time
4	AM	Field trip: seagrass experiment
	PM	Field trip: seagrass experiment
	EVENING	Lecture/Scientific Paper Discussion & Free Time
5	AM	Field trip: coral reef experiment
	PM	Field trip: coral reef experiment
	EVENING	Lecture/Scientific Paper Discussion & Free Time
6	AM	Field Trip: Coral Reef Dive
	PM	Independent Project Planning
	EVENING	Independent Project Planning & Free time
7	AM	Field/Lab: Student Independent Projects
	PM	Field/Lab: Student Independent Projects
	EVENING	Lecture/Scientific Paper Discussion & Free Time
8	AM	Field/Lab: Student Independent Projects
	PM	Field/Lab: Student Independent Projects
	EVENING	Lecture/Scientific Paper Discussion & Free Time
9	AM	Field/Lab: Student Independent Projects
	PM	Field/Lab: Student Independent Projects
	EVENING	Lecture/Scientific Paper Discussion & Free Time
10	AM	Field/Lab: Student Independent Projects
	PM	Field/Lab: Student Independent Projects
	EVENING	Lecture/Scientific Paper Discussion & Free Time
11	AM	Field/Lab: Student Independent Projects
	PM	Field: Seagrass Experiment Break-down & Organism ID Exam
	EVENING	Free Time & pack for AM departure
12	AM	Travel to Jungle Jeanies on mainland
	PM	Primary school outreach activity
	EVENING	Free Time
13	AM/PM	Rainforest Excursion
	EVENING	Free Time & pack for AM departure
14	AM/PM	Travel Day: Jungle Jeanie's by Bus - Belize City; flight to Norfolk
AT ODU		
day after return	PM	Post-trip planning: Independent project tasks, analyses & instructions
interim weeks	AM/PM	No Class: work on Independent project analysis/writing/presentation
last day classes	PM	Independent Project Written & Video Presentations