

**BIO220: An Introduction to Tropical Biology Syllabus
Spring Semester 2012**

Instructor:

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Class Meeting Time: M, R 10:00 AM - 11:15 AM.

Room: AM 311

Laboratory: La Selva Biological Station, Puerto Viejo Sarapiquí, and Cahuita National Park, Limón, Costa Rica. March 31 - April 09, 2012.

Recommended Text: In addition to the text below, additional readings from the primary and secondary literature will be provided and/or assignments made.

Kricher, John C. *A Neotropical Companion*. Second edition. Princeton University Press. Princeton, N.J. 1997.

*Kricher, John. *Tropical Ecology*. First Edition. Princeton University Press 2011.

***NOTE:** This book is available electronically through the PC library. I will provide you with more information later on how to access it.

Recommended Texts:

Greenspan, Eliot. *Frommer's Costa Rica 2012*. Frommers. 2011.

Guyer, C. and Maureen A. Donnelly. *Amphibians and Reptiles of La Selva, Costa Rica and the Caribbean Slope*. University of California Press. 2005.

Janzen, Daniel H. *Costa Rican natural history*. University of Chicago Press, 1983.

Kaplan, Eugene. H. *Peterson Field Guide: Coral Reefs*. Houghton Mifflin Co. Boston, 1999.

Kaplan, Eugene. H. *Peterson Field Guide: Southeastern and Caribbean Seashores*. Houghton Mifflin Co. Boston, 1999.

Letcher, S.G. 2005. *Common Plant Families of La Selva Biological Station*. Lulu Press, Morristown, N.C.

Lotschert, W.; and G. Beese. *Collins Guide to Tropical Plants: A Descriptive Guide to 323 Ornamental and Economic Plants*. Harper Collins Pub Ltd. 1999.

McDade, Lucinda A.; Lamaljit, S. Bawa; Henry A. Hespenheide, and Garry S. Hartshorn. *La Selva, Ecology and Natural History of a Neotropical Rain Forest*. The University of Chicago Press. 1994.

Stiles, F. Gary; and Alexander F. Skutch *A guide to Costa Rican birds*. Cornell University Press 1990.

Terborgh, John. *Diversity and the Tropical Rain Forest*. Freeman. Scientific American Books 1992.

Selected Informative Web Sites:

La Selva Biological Station: <http://www.ots.ac.cr/en/laselva/>

La Selva Biological Station, Species list: <http://www.ots.duke.edu/en/laselva/species/>

La Selva Biological Station (researchers intranet): <http://sloth.ots.ac.cr/>
La Selva Biological Station: <http://www.1costaricalink.com/eng/web/parks/pv-laselva.htm>
Tirimbina Rainforest Center: <http://www.tirimbina.org/>
INBio National Biodiversity Institute: <http://www.inbio.ac.cr/en/default2.html>
Listing of General Web Sites for Costa Rica and Latin America:
<http://lanic.utexas.edu/la/ca/cr>
Cahuita Beach: <http://www.govisitcostarica.com/region/city.asp?cID=177>
Cahuita beach: <http://www.infocostarica.com/places/cahuita.html>
Cahuita Beach: <http://www.globosapiens.net/travel-information/Cahuita-932.html>
Atlantida Lodge: <http://www.atlantida.co.cr/>
Sloth Sanctuary of Costa Rica: <http://www.slothrescue.org/index.html>
Hotel Cacts in San Jose: <http://www.hotelcacts.com/pagina/menu.html>
Costa Rica Vacation Travel Reviews:
<http://www.etravelreviews.com/costarica/?gclid=CIGt49PGyoICFQkDGgodMAV96A>

Lectures:

Because of the countless possible topics that could be covered in this course, and because of the need to cover them before we embark on our field work, the following is by necessity a rough outline and tentative schedule of topics and assignments. The course introduces selected aspects of the biology (physiology, ecology, taxonomy) of tropical organisms and ecosystems. Terrestrial and marine systems will be studied in class as well as in the field and laboratory in Costa Rica.

The course is a four-credit course, approximately (see grading below) three credits assigned to lecture and one to laboratory study. Your grade for the course will be based on performance on examinations, reading assignments, a literature review paper, laboratory assignments/notebook, field exam, and field study presentations.

Laboratory/Field Study:

The laboratory/field study component consists of ten days of field and lab work in two localities of Costa Rica. First, we will travel to La Selva Biological Station, in Puerto Viejo, Sarapiquí (http://www.ots.ac.cr/index.php?option=com_content&task=view&id=162&Itemid=348). In La Selva we will survey terrestrial ecosystems. This Biological Station belongs to the Organization for Tropical Studies (OTS, <http://www.ots.ac.cr/>) a consortium of 63 US Universities and Colleges (Providence College, included) ran by Duke University. It comprises 1,600 hectares (3,900 acres) of tropical wet forests and disturbed lands. Second, we will then travel to Cahuita province of Limón in the Caribbean coast, where we will study marine ecosystems. Cahuita National Park's rain forest measures 1067 hectares, including 240 hectares of reef that extend outward from Cahuita Point. The terrestrial and aquatic ecosystems from these two localities will illustrate some of the concepts developed in class. Each student will be expected to complete daily individual/group work, help design and execute group field projects, maintain a field log and participate in the writing and editing of a field journal.

The field log, much like a laboratory notebook, should contain all field notes, data, analyses and interpretation of studies as assigned on a daily basis. Further guidelines will be

provided. There will be a field practical exam before we leave Costa Rica, which will require identification of organisms and their habitats seen during the fieldwork there. (A list of organisms will be distributed before we leave so that students can organize themselves into "search parties" and develop strategies for group learning). Part of the classroom time upon return from Costa Rica will be devoted to analysis of field project data, preparation of the project journal, in class presentations of field study projects, and completion of a literature review paper.

Grading:

Grades will be based on the completion of the following:

Class/Reading Assignments	10%
Two hourly exams	30% (15% each)
Literature review paper	20%
Field practical exam	15%
Field/lab notebook (log) and field work	10%
<u>Field project journal & presentation</u>	<u>15 %</u>
TOTAL	100%

Organization:

Costa Rica has been a field site for Tropical Biology since 2006 (Dr. Crafts used to travel to Belize as well as Dr. Ewanchuk does now). Prior to our field study, we will discuss fundamentals of tropical ecology. Some time will also be devoted to discussion of primary and secondary literature dealing with topics in tropical biology and aspects of the local ecology, history, culture, geography, politics and sports of Costa Rica. Additionally, we will consider the global conservation concerns and use Costa Rica as a model to evaluate its conservation efforts. Costa Rica is the third Greenest countries in the world!

(<http://green-buzz.net/environment/10-worlds-greenest-countries/>)

The first part of the semester will be *approximately* evenly divided between tropical terrestrial and marine ecosystems. All slides used in class will be available on the course site of Sakai. Feel free to print them, but in the interest of conservation, be sure to set the printer for 6 slides per page. It is expected that all students come to class prepared with comments and questions on the relevant reading assignments from the textbook (Kricher), or other sources provided. To help organize and synthesize your reading, message board assignments will be posted on Angel.

Since not all topics can be covered completely in one course, each student will complete a review of the literature on a subject of his/her interest and choice. We will discuss the assignment early in the semester. At the end of the semester, students will complete their literature review papers, field projects, write, edit, produce the field project journal and prepare for the seminar presentations.

While the course will cover topics in terrestrial biology in the first half and continue with marine biology in the second half of the semester (all before our field study), these divisions are somewhat artificial since principles applying to one area also often apply to the other. Keep this in mind. The sequence of material to be covered is roughly as follows. Reading assignments

will be posted on the Sakai Calendar on the date they should be completed, i.e. they will provide the basis for class discussion or presentations. Discussion Forum assignments will be also noted on the Calendar. Forum assignments are due at 8:30AM on the dates assigned. This will allow me to review them prior to class.

As part of the class assignments and in preparation to our field trip, every student will be involved in the Adopt-A-Species project. Each student will gather information on one plant and one animal species from the tropics that will become at the end part of our Wiki Page for the course. We will also develop a Tropical Biology blog with entries for every day experiences during our trip, documented with photos and videos. More information to be provided soon.

Part I: Tropical Terrestrial Ecosystems

What and Where are the Tropics?

Biogeography and Evolution in the Tropics

Inside Tropical Rain Forests: Structure

Inside Tropical Rain Forests: Biodiversity

A Study of Biodiversity: Rain Forest Tree Species Richness

Biotic Interactions and Coevolution in Tropical Rain Forests

Forest Fragmentation and Biodiversity

Conservation Outlook for the Tropics

EXAM I

Part II: Tropical Marine Ecosystem

Coastal Ecology-Strand Beaches

Marine Provinces & The Physical and Chemical Properties of Tropical Seawater

The Rocky Shore and Intertidal Zone - Distribution of Indicator Species of Molluscs

The Lower Intertidal Zone and Platform - Seaweeds & Seagrass Diversity

A Community of Herbivores: Echinoderms, Molluscs, Segmented Worms.

The Cnidaria

Coral Reef - Origin and Zonation

The Coral/Algal Symbiosis -The Trophic Base for Coral Reef Ecology

The Coral Reef Community

EXAM II

Field trip with group projects completed (March 31st to April 09th)

FIELD PRACTICAL EXAM. To be completed in the field

Return to Providence

Work on statistical analyses of data from field

Group presentations on specific research projects

Final Presentations – Preparation of Tropical Biology Journal

Group presentation for Department of Biology