

SEMESTER AT SEA COURSE SYLLABUS

Discipline: Biological Science
Semester and Year: Fall 2006
Course # and Title: **Biology for Non-Majors –
The Ecology and Conservation of Biodiversity Hotspots**
Faculty Name: Dr. Timothy Kittel

Suggested Pre-requisites: None

COURSE DESCRIPTION

Ecology is the study of how organisms interact among themselves and with their physical environment. This course is an introduction to principles of ecology and their application to the conservation of endangered species and landscapes. We will focus on “biodiversity hotspots” and other conservation areas in the regions we visit during the voyage – and discuss the factors that may have led to their high diversity and evaluate the threats they face. We will examine the processes that regulate populations, determine the structure of natural communities, and influence their distribution across landscapes. Using field practica and in-class student presentations on local case studies, the course will explore the defining nature of these areas and current practices employed in their conservation. Such practices include preserve selection and design, wildlife conservation medicine, reintroduction of species, identifying services ecosystems provide to society, international agreements, and the linkage of conservation goals to sustainable economic development. Suggested equipment: Binoculars are highly recommended for use on field practica.

COURSE OBJECTIVES

This class is designed to introduce ecological concepts and issues in conservation biology to non-science majors. In addition, lower-division science students should find the course to be challenging and informative; students can individualize the Field Component (p. 4) to match their interests and background. To meet these goals, the course explores **four themes**:

- (1) **Geography of Biodiversity** – What ecological and geographical processes have given rise to areas with high biodiversity?
- (2) **Value of Biodiversity** – As a society, what values do we place on biodiversity? Can we reconcile these with other demands for the use of natural resources?
- (3) **Threats and Vulnerability** – What major threats face endangered species and landscapes? What is it about the ecology of these organisms and systems that makes them vulnerable or resilient to such threats?
- (4) **Conservation Solutions** – What practices, combining conservation biology and societal decision-making, can be successful in preserving hotspots of biodiversity and other critical ecosystems?

TOPICAL OUTLINE OF COURSE

#	Date depending on A or B schedule	Topic / Activity (lecture & class discussion topics in bold ; in-class exercises and student presentations <u>underlined</u> ; quizzes in <i>Italics</i>)	Readings Primack (P) +Reserve: CI:Hotspots (HS), CI:Wilderness (W)	Voyage location
1		<i>Course intro</i> – Ecology and the Goals of Conservation Biology – The World’s Biodiversity Hotspots <u>Class Exercise: Tour of the world’s biodiversity hotspots through student experiences</u>	P: 1-11	Ensenada to Honolulu
2		Our Motivation: The Value of Biodiversity – Elements of Biodiversity <u>Class Exercise: Conflict resolution in conservation (role playing) – intersection of science & societal values</u>	P: 34-59	to Honolulu
		<i>In port</i>		Honolulu
3		Origins of Biodiversity – Evolutionary Processes <u>Class Exercise: Natural selection & genetic drift models</u>	P: 11-27 Reserve articles	to Japan
4		Patterns of Biodiversity – Island Biogeography and Conservation – Japanese Archipelago Hotspot <u>Class Exercise: Island biogeography models</u>	P: 27-34 HS: Japan	to Japan
5		Patterns of Extinction: Overview of Threats & Ecological Vulnerability <u>Class Exercise: Ecological footprint</u>	P: 61-95, 113-117	to Japan
6		Student Case Study Presentations I: Japan <i>Quiz 1</i>		to Japan
		<i>In port</i>		Japan
7		<i>Field Reports: Japan</i> Mountains of Southwest China Hotspot <u>Student Presentations II: China</u>	HS: Southwest China Mtns	to China
		<i>In port</i>		China/Hong Kong
8		<i>Field Reports: China & Hong Kong</i> The Indo-Burma Hotspot <u>Student Presentations III: Vietnam</u>	HS: Indo-Burma	to Vietnam
		<i>In port</i>		Vietnam
9		<i>Field Reports: Vietnam</i> Populations – Conservation of Small Populations <u>Class Exercises: (1) Population viability models & (2) Fragmentation models</u>	P: 100-105, 110-113, 121-146 W: Sundarbans	to Myanmar
10		<u>Student Presentations IV: Myanmar</u> <i>Quiz 2</i>		to Myanmar
A11		Ecosystem Dynamics – ‘Ecosystem Services’ <u>Class Discussion: Site selection–Juggling multiple criteria [if B schedule, see B13]</u>	Reserve reading	to Myanmar
		<i>In port</i>		Myanmar
B11/ A12		<i>Field Reports: Myanmar</i> Western Ghats & Sri Lanka Hotspot <u>Student Presentations V: India</u>	HS: Western Ghats & Sri Lanka	to India

TOPICAL OUTLINE OF COURSE (*continued*)

		<i>In port</i>		India
B12/ A13		<i>Field Reports:</i> India Community Dynamics – Disturbance: Fire – Invasive Species <u>Class Exercise: “Invasive Species on Trial: Guilty of Genocide (Species Extinctions)?” I – Preparation</u>	P: 105-110 Reserve articles	to Egypt
B13		[=A schedule A11] Ecosystem Dynamics – ‘Ecosystem Services’ <u>Class Discussion: Site selection–Juggling multiple criteria</u>	Reserve reading	
14		<u>Class Exercise: “Invasive Species on Trial: Guilty of Genocide (Species Extinctions)?” II – The Trail</u> Landscape Processes – Landuse Change: Desertification – The Mediterranean Hotspot	HS: Mediterranean W: Sahara & Sahel, Arabian Deserts	to Egypt
15		Global Environmental Change <u>Class Exercise: Climate Change Impacts</u>	P: 95-100 Reserve articles	
16		<u>Student Presentations VI: Egypt</u> Quiz 3		to Egypt
		<i>In port</i>		Egypt
17		<i>Field Reports:</i> Egypt The Irano-Anatolian Hotspot <u>Student Presentations VII: Turkey</u>	HS: Irano-Anatolian	to Turkey
		<i>In port</i>		Turkey
18		<i>Field Reports:</i> Turkey <u>Student Presentations VIII: Croatia & Spain</u>	W: European Mtns	to Croatia
		<i>In port</i>		Croatia
19		<i>Field Reports:</i> Croatia Voyage Synthesis Workshop: “Conservation Solutions” – Working Groups convene: I: Protected Areas – Design & Management II: Restoration Ecology & Species Reintroduction	P: 265-273 ←P: 183-225 ←P: 146-171, 225-234	to Spain
20		<i>Working Group Reports:</i> Solutions Topics I & II		to Spain
		<i>In port –</i>		Spain
21		<i>Field Reports:</i> Spain Voyage Synthesis Workshop: “Conservation Solutions” – Working Groups convene: III: Conservation Law – Local, International IV: Sustainable Development	P: 265-273 ←P: 171-177, 239-244, 251-256 ←P: 244-251, 256-265	to Florida
22		<i>Working Group Reports:</i> Solutions Topics III & IV		to Florida
23		Final Exam		to Florida
		<i>In port – Home</i>		Florida

FIELD COMPONENT:

Students are expected to take part in directed or individual field practica in at least 3 ports of call that take them to natural areas and provide opportunities to experience and learn about local conservation practices. The 3 sites should be selected to sample each of the major regions visited: E/SE Asia, S Asia, and the Mediterranean. Students will (1) keep a field journal of observations and of what they learned from guides, experts, other on-site resources, and follow-up research and (2) report on these activities back to the class. A student may choose to work on an independent field project that involves individualized activities in several ports – such projects must be approved beforehand, devised and undertaken in consultation with the instructor, and presented back to the class during the field reports.

METHODS OF EVALUATION

25% *Exams* – There will be 3 quizzes (5% each) and a final exam (10%) covering material from lectures, readings, student presentations, and in-class discussion. The final will be cumulative.

15% *Pre-port Presentations* – Prior to arrival in each port, groups of 1-2 students will give short (5-10 min) presentations on conservation case studies in biodiversity “hotspot(s)” or other conservation areas in the region of the upcoming port. Grade will be based on oral presentation and a one-page annotated outline prepared for the class. Each student will have the opportunity to present such analyses three times during the voyage, one in each major area visited: E/SE Asia, S Asia, and the Mediterranean (3 presentations @5%). Students will be encouraged to select different ports from those used in their field component.

25% *Field Reports* – Following each port, students will lead a debriefing consisting of individuals or groups orally presenting reports from related practica and discussing experiences and insights. Each student is expected to contribute in meaningful ways to these discussions (20%). In addition, students are to keep a field journal of observations and of what they learned from guides, experts, and follow-on research (5%).

30% *Synthesis Working Groups* – In the final weeks of the course, students will participate in two synthesis working groups, each focused on evaluating practices in an arena of conservation. These arenas are:

- I: Protected Areas – Preserve selection, design, and management
- II: Restoration Ecology & Species Reintroduction – Recovery of degraded landscapes, and reintroduction (and management) of small populations of endangered species
- III: Conservation Law – Local and national laws, international agreements
- IV: Sustainable Development – Linkage of conservation and development goals

These synthetic assessments will cover experiences and knowledge gained throughout the voyage. They will be based on pre-port presentations research, visits to conservation areas during field practica, follow-up research, and other readings. The voyage synthesis will be conducted as a professional workshop. Individual grades will be based on participation in the group’s discussion, presentation to the rest of the class, and in the summary write-up (2 groups @15%).

5% *In-class Participation* – Each student is expected to participate in daily class exercises and discussions.

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REQUIRED TEXTBOOKS

AUTHOR: Richard B. Primack
TITLE: A Primer of Conservation Biology
PUBLISHER: Sinauer
ISBN #: 0-87893-728-5
DATE/ED: 2004, 3rd ed
COST: \$44.95

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RESERVE LIBRARY LIST

AUTHOR: Russell A. Mittermeier, Patricio Robles Gil, and others.
TITLE: “Hotspots Revisited: Earth's Biologically Richest and Most Threatened Terrestrial
Ecoregions”
PUBLISHER: Conservation International – *see Note (1)*
ISBN #: 9686397779 (English. Hardcover.)
DATE/ED: 2005, 2nd ed.
COST: \$65.00, including shipping

Instructor Notes:

- 1) Publisher's online listing:
<http://www.conservation.org/xp/CIWEB/library/books/hotspots_revisited.xml>
- 2) This book has a higher priority than the next listed request.
- 3) This is a large format book.

AUTHOR: Russell Mittermeier, Cristina Goettsch Mittermeier, and others.
TITLE: “Wilderness: Earth's Last Wild Places”
PUBLISHER: Conservation International – *see Note (1)*
ISBN #: 968-6397-698 (Hardcover)
DATE/ED: 2002
COST: \$75.00, including shipping

Instructor Notes:

- 1) Publisher's online listing:
<<http://www.conservation.org/xp/CIWEB/library/books/wilderness.xml>>
 - 2) This is a large format book.
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