Voyage: Spring 2016  
Discipline: Biology  
BIOL 3559-101: Conservation Biology  
Division: Upper  
Faculty Name: Dr. Catherine Pringle  
Credit Hours: 3; Contact Hours: 38

Pre-requisites:  
Introductory Biology

COURSE DESCRIPTION

This upper-level undergraduate course will review the drivers of global environmental change (human population growth and consumption of resources), resulting environmental degradation, and tools to slow down or address environmental damage. The course begins with analyses of current and historic changes in biodiversity, habitat conversion and fragmentation, and exotic species. Species, landscape, and ecosystem approaches to conservation are reviewed, including important tools such as management of source-sink dynamics, conservation genetics, population viability analysis, elements of nature reserve design, restoration, and environmental policy. Lectures toward the end of the course focus on the conservation challenges of disease, climate change, and toxic chemicals. The course uses case studies from the instructor’s own experiences in conservation research and management. Connections are explored between biodiversity and human health in a changing global environment. Special attention is paid to current conservation issues in countries and regions along the route of the voyage.

COURSE OBJECTIVES

General Goal: To provide students with a fundamental understanding of the ecological and evolutionary dimensions of conservation biology, along with science-based management and policy solutions. The course will combine lectures, readings, in-class presentations and exercises with a special emphasis on critical thinking, problem solving, and global understanding.

Specifics: By the end of this course students should be able to:
- understand ecological and evolutionary principles that underlie biological diversity;
- explain threats to biodiversity and consequences of biodiversity loss and to identify linkages among conservation challenges across different biological scales (genes to landscapes) and geographical scales (local to global);
- demonstrate how ecological and evolutionary principles are applied to solving conservation challenges;
• articulate our responsibility, as humans, to serve as global land stewards;
• apply critical reasoning skills to assessment, analysis, and synthesis of conservation problems and solutions; and
• demonstrate a greater understanding of: conservation issues in countries both outside and within the US; cultural differences in perceptions of problems; and effective solutions.

REQUIRED TEXTBOOKS

AUTHOR: Richard B. Primack
TITLE: Essentials of Conservation Biology
ISBN #: 978-1-60535-293-3

TOPICAL OUTLINE OF COURSE

Depart Ensenada- January 5:

A1- January 7: Introductions; What is Conservation Biology and Sustainable Development?
   Required Readings: 1. Primack Chapter 1

Writing Assignment #1: (5% grade; due Jan 9th); Students will write a short essay (not more than two double-spaced pages) based on the Ackerman book chapter (indicated above). Guiding thought-provoking questions will be provided in class to help direct these essays.

A2- January 9: Global Biodiversity and Why it is Important: Historic and Contemporary losses and patterns
   Required Readings: 1. Primack (course text): Chapters 2, 3, 7, 8
      345 (6195): 401-406.
   Recommended: 1. Kolbert (The Sixth Extinction): Chapters 1-5

A3- January 11: Current Threats to Biodiversity (55 min); Preview of conservation issues in Hawaii (20 min)
   Required Readings: 1. Primack (course text) Chapters 7, 8
Honolulu: January 12

**A4- January 15:** Conservation Ethics and Environmental Justice in the Age of Globalization;

Required Readings: 1. Primack Chapters 6, 20, 22  
2. Carbon trade-watch fact Sheets (2009) #1 and #2 (two pages each)  
Required DVD documentary: (40 min) The carbon connection 2007  
Recommended/or interest: The Pope’s (Papal) Encyclical (2015)

**A5- January 17:** Ecosystem Services and the Economics of Conservation

Required Readings: Primack (course text) Chapters 4, 5

Study Day: January 19

**A6- January 20:** Habitat Fragmentation

Required Readings: Primack (course text), Chapter 9

Recommended Readings: Crooks and Sanjayan, (Connectivity Conservation) Chapter 10

**A7- January 22:** Overexploitation with emphasis on “Fishing Down Marine Foodwebs (55 min); Preview of Conservation Issues in Japan (20 min)

Required Readings: 1. Primack (course text), Chapter 10  


**Writing Assignment #2** (5 % grade; due Jan 22nd): Students will write an essay (~2 pages, double spaced) based on: (1) the 2007 video, The carbon connection (conservation ethics of carbon trading on two different regions of the world affected by the global market); (2) two carbon trade-watch fact sheets (indicated above) and (3) independent, curiosity-driven research (internet and library).

Yokohama: January 24-2
In-Transit: January 26
Kobe: January 27-28

A8- January 29: Student Presentations/Discussion – Reflections on Japan (55 min); Preview of Conservation Issues in China (20 min)

2. Shapiro, J. 2012. *China’s environmental challenges* Chapters 1, 2, 3, and 7.

Shanghai: January 31-February 1
In-Transit: February 2-3
Hong Kong: 4-5


Ho Chi Minh: February 8-12


Required Readings: 1. Primack (course text) Chapter 10

Yangon: February 17-21

A12- February 22: Conservation at population and species levels (55 min); *Preview of conservation issues in India* (20 min)

Required Readings: 1. Primack (course text) Chapter 11, 12, 13, 14

A13- February 24: Midterm Exam

Cochin: February 26-March 2

A14- March 3: Student Presentations/Discussion – Reflections on India and cross-country comparisons

Study Day: March 5

A15- March 6: Ecosystem-level management of protected areas (55 min); *Preview of conservation issues in Mauritius* (20 min)

Required Readings: 1. Primack (course text) Chapters 15, 16,

Port Louis: March 12

A16- March 9: When Protected Areas Become “Population Sinks”: Examples from the U.S., Viet Nam, India and Africa

Study Day: March 11

A17- March 12: Park Management Case study: Kruger National Park, South Africa (55 min); Preview of conservation issues in South Africa (20 min)
   Required Readings: 1. Primack (course text): Chapters 17, 18;
   Recommended Readings: 1.

Cape Town: March 14-19

A18- March 20: Student Presentations/Discussion – Reflections on South Africa and Cross-Country Comparisons

A19- March 22: Ecological Restoration and Conservation at local, national and international levels
   Required Readings: 1. Primack (course text) Chapter 19, 20, 21

A20- March 24: Conservation Challenge I: Dealing with Emerging Infectious Diseases (55 min); Preview of conservation issues in Ghana (20 min)
   Required Readings: 1. Primack (course text): Chapter 10 (pp 241- 246)

Tema: March 26-28
Takoradi: March 29-30

A21- March 31: Student Presentations/Discussion – Reflections on Ghana and Cross-Country Comparisons

A22- April 2: Conservation Challenge II: Controlling Synthetic Chemicals in the Environment
Required Readings: Colburn et al. (199x) Chapters x, x, x
Required DVD: Homo toxicus

A23- April 4: Conservation Challenge III: Mitigating effects of Global Climate Change (55 min) and Preview of Conservation Issues in Morocco (20 min)
Required Readings: Primack (course text): Chapter 9 (pp 205-212)

Writing Assignment #3: (10% grade; due April 5th): In this longer (5-10 pages, double-spaced) writing assignment, students will pick a conservation theme from the class and write a paper comparing 3-5 countries (visited during the voyage) based on this conservation theme. The final report will involve internet and library research. A list of conservation themes will be provided to students to choose from.

Casablanca: April 6-10
Study Day: April 11

A24- A Day Finals, April 12

April 15: Disembarkation Day

FIELD WORK
Experiential course work on Semester at Sea is comprised of the required field lab led by your instructor and additional field assignments that span multiple ports.

FIELD LAB (At least 20 percent of the contact hours for each course, to be led by the instructor.)

Country: Honolulu, Hawaii

Coconut Island is a tropical marine research facility belonging to the University of Hawai‘i at Manoa’s Institute of Marine Biology. It is surrounded by 64 acres of coral reef and it supports
research in many disciplines of tropical science such as coral ecology, biogeochemistry, and evolutionary genetics. Students will travel on the station’s research vessel, deploying a plankton net along the way. Upon reaching Coconut Island they will encounter sharks and other research animals, then do two hands-on labs, one analyzing the plankton from the research cruise and the other sorting through invasive seaweeds to separate out and recover small creatures from the bay. The lab will provide first-hand exposure to the endangered coral ecosystem, and an appreciation of the role that scientific research plays in their conservation.

Objectives:

1. Understand the structure and biodiversity of coral reef ecosystems, and discuss the threats to their survival.

2. Tour a tropical marine research facility; speak with scientists engaged in marine research; and gain hands-on experience in data collection.

3. Develop an appreciation of the linkages between basic scientific research and applied conservation strategies.

FIELD ASSIGNMENT

- Students will write a two-page response (following the Field Lab) to specific questions posed by the instructor. Questions will require students to interpret and evaluate what they see, not just summarize.

WRITING ASSIGNMENTS

Writing Assignment #1: (5% grade; due Jan 9th): Students will write a short essay (not more than two double-spaced pages) based on the Ackerman book chapter (indicated above). Guiding thought-provoking questions will be provided in class to help direct these essays.

Writing Assignment #2 (5 % grade; due Jan 22nd): Students will write an essay (~2 pages, double spaced) based on: (1) the 2007 video, The carbon connection (conservation ethics of carbon trading on two different regions of the world affected by the global market); (2) two carbon trade-watch fact sheets (indicated above) and (3) independent, curiosity-driven research (internet and library).

Writing Assignment #3: (10% grade; due April 5th): In this longer (5-10 pages, double-spaced) writing assignment, students will pick a conservation theme from the class and write a paper comparing 3-5 countries (visited during the voyage) based on this conservation theme. The final report will involve internet and library research. A list of conservation themes will be provided to students to choose from.

Team Presentation: (10 % grade): Student “Presentations/Discussions” are included in class meetings that immediately follow return to the ship after a country visit. At the beginning of the
term, groups of 3-4 students will each be assigned a country that will be visited during the voyage (e.g., “Japan Group,” “India Group”). Immediately following the visit to their assigned country, the students will create a PowerPoint presentation (using images they collected during the country visit) and a written team summary that summarize and illustrate conservation themes relevant to that country. They will use this presentation to stimulate a class discussion of the country visited.

METHODS OF EVALUATION / GRADING RUBRIC

The final grade in the course will be computed as follows:

- 25% midterm examination
- 25% final examination
- 20% three writing assignments
- 20% field lab
- 10% team presentation

RESERVE BOOKS AND FILMS FOR THE LIBRARY

1. AUTHOR: Meffe, Groom and Carroll
   TITLE: Principles of Conservation Biology 3rd Edition
   PUBLISHER: Sinauer Associates
   ISBN #: 978-0-87893-597-0
   DATE/EDITION: 2006/3rd Edition

2. AUTHOR: Elizabeth Kolbert
   TITLE: The Sixth Extinction: An unnatural history
   PUBLISHER: Henry Holt and Company
   ISBN #: 978-0-8050-9299-8

3. AUTHOR: Theodore Colburn, Dianne Dumanoski, John Peterson Myers
   TITLE: Our Stolen Future
   PUBLISHER: Dutton Publishers
   ISBN #: 0-452-27414-1
   DATE/EDITION: 1997

4. AUTHOR: Reuben P. Keller
   TITLE: Invasive species in a globalized world
   PUBLISHER: University of Chicago Press
   DATE/EDITION: 2015

5. AUTHOR: Reuben P. Keller
   TITLE: Invasive species in a globalized world
   PUBLISHER: University of Chicago Press
DATE/EDITION: 2015

6. AUTHOR: Paul. Krausman and Bruce Leopold
TITLE: Essential Readings in Wildlife Management and Conservation
PUBLISHER: John Hopkins University Press
DATE/EDITION: 2013

7. AUTHOR: K. Crooks and M. Sanjayan
TITLE: Connectivity Conservation
PUBLISHER: Cambridge University Press
DATE/EDITION: 2006

8. DVD: Homo Toxicus

9. AUTHOR: Diane Ackerman
TITLE: The Human Age: The world shaped by us
PUBLISHER: W. W. Norton
ISBN: 978-0-393-2407-0
DATE/EDITION: 2014

10. AUTHOR: The Worldwatch Institute
TITLE: State of the World 2015: Confronting hidden threats to sustainability
PUBLISHER: Island Press
DATE/EDITION: 2015


13. AUTHORS by by Kamaljit Bawa (Author), S. Primack (Author), Richard B. Oommen (Author), Meera Anna (Author)
TITLE: Conservation Biology: A primer for South Asia
Paperback: 604 pages
PUBLISHER: Sinauer Associates

TITLE: The River Runs Black: The environmental challenge to China’s future
available in paperback

15. AUTHOR Shapiro, J. 2012.
TITLE: China’s environmental challenges
available in paperback

16. AUTHOR Union of Concerned Scientists (Lochbaum et al. 2014)
TITLE: Fukushima: The story of a nuclear disaster
PUBLISHER: The New Press, NY
ISBN: 978-1-59558-908-8 paperback

ELECTRONIC COURSE MATERIALS - See required and recommended readings listed above

ADDITIONAL RESOURCES
Students will be asked to locate some information on the Internet.

HONOR CODE
Semester at Sea students enroll in an academic program administered by the University of Virginia, and thus bind themselves to the University’s honor code. The code prohibits all acts of lying, cheating, and stealing. Please consult the Voyager’s Handbook for further explanation of what constitutes an honor offense.

Each written assignment for this course must be pledged by the student as follows: “On my honor as a student, I pledge that I have neither given nor received aid on this assignment.” The pledge must be signed, or, in the case of an electronic file, signed “[signed].”
Essentials of Conservation Biology, Sixth Edition, combines theory and applied and basic research to explain the connections between conservation biology and ecology, climate change biology, the protection of endangered species, protected area management, environmental economics, and sustainable development. A major theme throughout the book is the active role that scientists, local people, the general public, conservation organizations, and governments can play in protecting biodiversity, even while providing for human needs. Each chapter begins with general ideas and principles, which are rich in context and application. Essentials of Conservation Biology has established itself as an engrossing book from which to learn or teach. Combining theory and research and with examples from current literature, the book explain the links between conservation biology and other fields such as ecology, climate change, environmental economics, sustainable development and more.