SEMESTER AT SEA COURSE SYLLABUS

Colorado State University, Academic Partner

Voyage:	Fall 2019
Discipline:	Natural Resources
Course Number and Title:	NR 300 Biological Diversity
Division:	Upper
Faculty Name:	Dr. Kate Huyvaert
Semester Credit Hours:	3

Prerequisites: One (1) introductory biology OR one (1) environmental conservation course

COURSE DESCRIPTION

The maintenance of biological diversity is one the greatest challenges our world faces today as the 'Sixth Mass Extinction' is currently underway and species are disappearing at an alarming rate. This course will provide students with an appreciation of the patterns of species diversity around the globe and an understanding of the factors leading to extinction. Students will learn about relevant theory, principles, and practices needed to understand and resolve issues in biodiversity conservation. The Semester-at-Sea voyage will allow students to experience firsthand global patterns of biodiversity and conservation in action. Throughout the voyage, we will compare the challenges to the conservation of biological diversity faced by countries with different populations, cultures, and economies.

LEARNING OBJECTIVES

1) Understand the theoretical foundations of conservation biology.

2) Be conversant about the political, social, and economic consequences of biotic impoverishment and the need to balance the needs of people with nature.

3) Define the tools used to maintain biodiversity and apply them to contemporary issues in conservation biology.

4) Apply techniques for communicating conservation biology.

REQUIRED TEXTBOOKS and SUPPLIES

AUTHOR: Richard. B. Primack and Anna A. Sher
TITLE: An Introduction to Conservation Biology
PUBLISHER: Sinauer Associates, Inc. Publishers
ISBN #: 9781605354736
DATE/EDITION: 2016/ 1st

Supplies: Small (4"x6" or 4 5/8"x7") Rite-in-the-Rain or similar field notebook/journal

TOPICAL OUTLINE OF COURSE

Depart Amsterdam, The Netherlands — September 9

B1—September 12:

Topic: Introduction to Conservation Science
Readings: Primack and Sher Chapter 1; Soule 1985; Kareiva & Marvier 2012
Assignment: Choose your discussion weeks; Skim book for Op-Ed article topic and Comparison Across Ports IGNITE presentation ideas.

B2—September 14:

Topic: What is Biodiversity?
Readings: Primack and Sher Chapter 2; Poland Biodiversity Profile

Gdansk, Poland — September 15-20

B3—September 22:

Topic: The Value of Biodiversity
Readings: Primack and Sher Chapter 3
Assignment: Finalize Op-Ed article topic; Finalize Comparison Across Ports topic

B4—September 24:

Topic: Ecosystem Services
Readings: Boyles et al. 2011; McCauley 2006 & replies
Assignment: Debate (Ecosystem Services)

Lisbon, Portugal — September 26-28
Cadiz, Spain — September 29 – October 1

B5—October 2:

Topic: Threats to Biodiversity I
Readings: Primack and Sher Chapter 4 pgs 90-112 (Human population growth, habitat destruction and fragmentation, environmental degradation and pollution); Spain Biodiversity Report

B6—October 4:

Topic: Threats to Biodiversity II
Readings: Primack and Sher Chapter 4 pgs 118-125 (Global Climate Change); McLachlan et al. 2007; Ricciardi & Simberloff 2009;
Assignment: Debate (assisted migration)

Dubrovnik, Croatia — October 6-10

B7—October 11:

Topic: Threats to Biodiversity III

Readings: Primack and Sher Chapter 4 pgs 132-149 (Invasive Species, Disease); Davis et al. 2011 & replies; Keesing and Ostfeld 2015; Croatia Biodiversity Strategy
Assignment: Debate (Don't judge species by their origins; Davis et al. & replies)

B8—October 13:

Topic: Extinction is Forever
Readings: Primack and Sher Chapter 5 pgs 150-171.
Assigment: Submit Op-Ed draft for peer review; Morocco Biodiversity Profile; Pleguezuelos et al 2018.

Casablanca, Morocco — October 15-20

B9—October 21:

Topic: Status of Africa's Biodiversity; Threats to Biodiversity IV
Readings: Primack and Sher Chapter 4 pgs 126-131 (Overexplotation); Skim State of Biodiversity in Africa; Read Brashares et al. 2004; Biggs et al. 2013; Mekonnen and Hoekstra 2016.

B10—October 23:

Topic: Status of Ghana's Biodiversity; Threats to Biodiversity V
Readings: Ghana's 5th National Biodiversity Strategy

B11—October 26:

Topic: EXAM 1
Assignment: EXAM 1

Tema, Ghana — October 28-30
Takoradi, Ghana — October 31 – November 1

B12—November 2:

Topic: Problems of Small Populations
Readings: Primack and Sher Chapter 5 pgs 172-191;

B13—November 5:

Topic: Conserving Populations and Species I
Readings: Primack and Sher Chapter 6 pgs 192-211 (PVA, metapopulations, long-term monitoring); Bakker and Doak 2009.

Community programming – November 6 (no class)

B14—November 7:

Topic: Conserving Populations and Species II
Readings: Primack and Sher Chapter 6 pgs 212-233 (Conservation strategies and legal protections).

B15—November 9:

Topic: Status of Brazil's Biodiversity
Readings: Brazil's National Report; Krupnick 2013 (deforestation); Leaflet 10: Indigenous People and the Environment

Salvador, Brazil — November 10-15

B16—November 17:
Topic: Bringing Species Back from the Brink
Readings: Primack and Sher Chapter 7 pgs 234-262; Donlan et al. 2006 (rewilding); *NYT Magazine*: The mammoth cometh (https://www.nytimes.com/2014/03/02/magazine/the-mammoth-cometh.html)
Assignment: Debate (Rewilding)

B17—November 19:
Topic: Protected Areas I
Readings: Primack and Sher Chapter 8 pgs 264-282 (establishing and designing protected areas, marine protected areas)

Community programming – November 21 (No class)

B18—November 22:
Topic: Protected Areas II
Readings: Primack and Sher Chapter 8 pgs 283-303 (networks of protected areas, landscape ecology, challenges to park management); Trinidad and Tobago National Report Chapter 1.

Port of Spain, Trinidad and Tobago — November 24

B19—November 25:
Topic: Conservation Outside Protected Areas
Readings: Primack and Sher Chapter 9.

B20—November 27:
Topic: Biodiversity in the Neotropics
Readings: Watkins and Donnelly 2005; Field class prep; Final op-ed article due

B21—November 30:
Topic: Status of Ecuador's Biodiversity
Readings: Ecuador National Biodiversity Strategy and Action Plan
Assignment: Watch *Galapagos: The Islands That Changed the World*; Field class prep

Guayaquil, Ecuador — December 2-7 – Field class, 2 December 2019

B22—December 8:
Topic: IGNITE presentations, Part 1
Assignment: IGNITE presentations, Part 1; Field class reflections due

B23—December 10:

Topic: IGNITE presentations, Part 2

Assignment: IGNITE presentations, Part 2

Puntarenas, Costa Rica — December 11-15

B24—December 17

Topic: What will 'future Earth' look like? (And how do we get there?)

Readings:

B25—December 19: Final Exam

Arrive San Diego, California — December 23

FIELD WORK

Semester at Sea field experiences allow for an unparalleled opportunity to compare, contrast, and synthesize the different cultures and countries encountered over the course of the voyage. In addition to the one field class, students will complete independent field assignments that span multiple countries.

Field Class:

The field class for this course is on **Monday, December 2, 2019 in Guayaquil, Ecuador.**

Field Class attendance is mandatory for all students enrolled in this course. Do not book individual travel plans or a Semester at Sea sponsored trip on the day of your field class. Field Classes constitute at least 20% of the contact hours for each course, and are developed and led by the instructor.

Where the River Meets the Sea: Crossroads of Conservation in Ecuador

Ecuador, while small in size, is one of the most biodiverse countries in the world in large part because of the diversity of ecosystems that this small country boasts. We will visit Reserva Ecológica Manglares Churute (Churute Mangrove Ecological Reserve) where the Guayas River meets the Gulf of Guayaquil and is home to five different ecological zones, including mangrove forest, wetlands, and tropical dry forest in addition to hundreds of species of flora and fauna. We will spend the day exploring the tropical forests and mangrove by foot and by canoe to develop our own 'biodiversity snapshot' and to deepen our understanding of the many different pressures faced by the world's biological diversity. We will also meet with the reserve managers to discuss conservation of biological diversity in our rapidly changing world.

Objectives of this field class are to:
1) understand the past and current state of biodiversity of mangrove systems;
2) identify challenges to conserving and managing biodiversity such as climate change, habitat fragmentation, and urbanization;

3) gain experience observing organisms in nature; and
4) reflect on the factors that promote or limit biodiversity, especially in tropical systems.

Independent Field Assignments

Biodiversity Comparison Across Ports

Each student will choose a biodiversity-related topic to examine more deeply by comparing the topic across the ports of our voyage. Students will keep field notes about their topic and each student will present a speed talk/IGNITE talk like those given at a scientific conference (5 minute Powerpoint talk, 2-3 minutes of questions from the audience). All presentations will be posted on Moodle. Each student will also provide a set of 3 questions relevant to their conservation issue to be considered for use on the final exam. The field notes, IGNITE talk, and exam questions will be evaluated as 20% of the final grade. IGNITE talks will be the week of December 8 and 10, 2019, and the field class reflection will be due on December 8, 2019.

METHODS OF EVALUATION

Discussion and Debate

During many class periods we will have an in-class discussion focused on papers from the scientific literature. Typically, a team of 2 students will be assigned to lead each discussion section. The lead students are expected to submit 3-5 discussion questions on the reading for posting on Moodle no later than the class period before the discussion. Each student in the course must come to each discussion section prepared to discuss these questions and other elements of the paper. At the start of the discussion, the lead students will provide a concise overview of the paper. In the summary, leaders should: 1) review the major points of the paper, 2) highlight novel results and conclusions, 3) relate the paper to other readings or discussions in class or your own knowledge, and 4) raise questions or objections you have with the methods, results, and/or conclusions. Following the summary, the lead students should then be prepared to actively generate and facilitate discussion for the rest of the allocated time. You will be assigned a grade for leading the discussion.
We will also have four debates that focus on important emerging issues in conservation biology. Details on the topic and structure of the debates will be provided in class.

Op-Ed Article/Advocacy Letter and Elevator 'Workshop' Talk

Each student will be required to write a brief (300-500 word) "Op-Ed" or advocacy letter on a current conservation biology topic or issue of their choice. The article should be written for an appropriate outlet (e.g., local, regional, national or international newspaper, depending on the scope of your issue; your congressperson). We will 'workshop' the articles in class and your classmates will provide suggestions for improvement before final submission to the instructor and (optional) submission to an outlet. More details on this assignment will be given in class.

Assignment	% Final Grade
Discussion Lead	5%
Debates	10%

Op-Ed/Advocacy Assignment	10%
Field trip Essay Assignment*	10%
Comparison Across Ports	20%
Midterm Exam	20%
Final Exam	20%
Participation and Attendance	5%

*Students not participating in the field class will lose credit as follows: 10% for the field trip assignment, 5% participation and attendance, and 5% of the Comparison Across Ports totaling 20% of the final grade.

GRADING SCALE

The following Grading Scale is utilized for student evaluation. Pass/Fail is not an option for Semester at Sea coursework. Note that C-, D+ and D- grades are also not assigned on Semester at Sea in accordance with the grading system at Colorado State University (the SAS partner institution).

Pluses and minuses are awarded as follows on a 100% scale:

Excellent	Good	Satisfactory/Poor	Failing
97-100%: A+	87-89%: B+	77-79%: C+	Less than 60%: F
93-96%: A	83-86%: B	70-76%: C	
90-92%: A-	80-82%: B-	60-69%: D	

ATTENDANCE/ENGAGEMENT IN THE ACADEMIC PROGRAM

Attendance in all Semester at Sea classes, including the Field Class, is mandatory. Students must inform their instructors prior to any unanticipated absence and take the initiative to make up missed work in a timely fashion. Instructors must make reasonable efforts to enable students to make up work which must be accomplished under the instructor's supervision (e.g., examinations, laboratories). In the event of a conflict in regard to this policy, individuals may appeal using established CSU procedures.

LEARNING ACCOMMODATIONS

Semester at Sea provides academic accommodations for students with diagnosed learning disabilities, in accordance with ADA guidelines. Students who will need accommodations in a class, should contact ISE to discuss their individual needs. Any accommodation must be discussed in a timely manner prior to implementation.

A letter from the student's home institution verifying the accommodations received on their home campus (dated within the last three years) is required before any accommodation is provided on the ship. Students must submit this verification of accommodations to

academic@isevoyages.org as soon as possible, but no later than two months prior to the voyage. More details can be found within the Course Registration Packet, as posted to the Courses and Field Classes page no later than one month prior to registration.

STUDENT CONDUCT CODE

The foundation of a university is truth and knowledge, each of which relies in a fundamental manner upon academic integrity and is diminished significantly by academic misconduct. Academic integrity is conceptualized as doing and taking credit for one's own work. A pervasive attitude promoting academic integrity enhances the sense of community and adds value to the educational process. All within the University are affected by the cooperative commitment to academic integrity. All Semester at Sea courses adhere to this Academic Integrity Policy and Student Conduct Code.

Depending on the nature of the assignment or exam, the faculty member may require a written declaration of the following honor pledge: "I have not given, received, or used any unauthorized assistance on this exam/assignment."

RESERVE BOOKS FOR THE LIBRARY

AUTHOR: Richard. B. Primack and Anna A. Sher
TITLE: *An Introduction to Conservation Biology*
PUBLISHER: Sinauer Associates, Inc. Publishers
ISBN #: 9781605354736
DATE/EDITION: 2016

AUTHOR: Richard B. Primack
TITLE: *Essentials of Conservation Biology 6th Edition*
PUBLISHER: Sinauer Associates, Inc. Publishers
ISBN #: 978-1-60535-289-3
DATE/EDITION: 2014/6th

AUTHOR: Kolbert, E.
TITLE: *The Sixth Extinction: An Unnatural History*
PUBLISHER: Henry Holt & Company
ISBN #: 978-0-8050-9299-8
DATE/EDITION: 2014

AUTHOR: Edward O. Wilson
TITLE: *The Diversity of Life*
PUBLISHER: Harvard University Press
ISBN #: 0-674-21298-3
DATE/EDITION: 1992/1st

FILM REQUEST

Title of Film: Galápagos: The islands that changed the world
Distributor: BBC Films

ELECTRONIC COURSE MATERIALS (from the peer-reviewed literature) – Note: I also have these as PDFs

AUTHOR: Bakker, V. J. and D. F. Doak
ARTICLE/CHAPTER TITLE: Population viability management: ecological standards to guide adaptive management for rare species
JOURNAL/BOOK TITLE: Frontiers in Ecology and the Environment
VOLUME: 7(3)
DATE: 2009
PAGES: 158-165

AUTHOR: Biggs, D., F. Courchamp, R. Martin and H. P. Possingham
ARTICLE/CHAPTER TITLE: Legal Trade of Africa's Rhino Horns
JOURNAL/BOOK TITLE: Science
DATE: 2013
PAGE: 339
AUTHORS: Boyles, J. G., P. M. Cryan, G. F. McCracken and T. H. Kunz
ARTICLE/CHAPTER TITLE: Economic Importance of Bats in Agriculture
JOURNAL/BOOK TITLE: Science
VOLUME: 332
DATE: 2011
PAGES: 41-42

AUTHOR: Brashares, J. S., P. Arcese, M. K. Sam, P. B. Coppolillo, A. Sinclair and A. Balmford
ARTICLE/CHAPTER TITLE: Bushmeat hunting, wildlife, declines, and fish supply in West Africa
JOURNAL/BOOK TITLE: Science
VOLUME: 306
DATE: 2004
PAGES: 1180-1183

AUTHORS: Coffey, J. and B. Alberts
ARTICLE/CHAPTER TITLE: Improving Education Standards
JOURNAL/BOOK TITLE: Science
VOLUME: 339 (6119)
DATE: 2013
PAGES: 489-489

AUTHOR: Davis, M.
ARTICLE/CHAPTER TITLE: Don't judge species on their origins
JOURNAL/BOOK TITLE: Nature

VOLUME: 474
DATE: 2011
PAGES: 153-154

AUTHORS: Donlan, C., J. Berger, C. E. Bock, J. H. Bock, D. A. Burney, J. A. Estes, D. Foreman, P. S. Martin, G. W. Roemer, F. A. Smith, M. E. Soule and H. W. Greene
ARTICLE/CHAPTER TITLE: Pleistocene Rewilding: An optimistic agenda for twenty-first century conservation.
JOURNAL/BOOK TITLE: American Naturalist
VOLUME: 168
DATE: 2006
PAGES: 660-681

AUTHORS: Fischer, J., B. Brosi, G. C. Daily, P. R. Ehrlich, R. Goldman, J. Goldstein, D. B. Lindenmayer, A. D. Manning, H. A. Mooney, L. Pejchar, J. Ranganathan and H. Tallis
ARTICLE/CHAPTER TITLE: Should agricultural policies encourage land sparing or wildlife-friendly farming?
JOURNAL/BOOK TITLE: Frontiers in Ecology and the Environment
VOLUME: 6(7)
DATE: 2008
PAGES: 380-385

AUTHORS: Kareiva, P. and M. Marvier
ARTICLE/CHAPTER TITLE: What Is Conservation Science?
JOURNAL/BOOK TITLE: Biological Science
VOLUME: 62(11)
DATE: 2012
PAGES: 962-969

AUTHORS: Keesing, F. and R. S. Ostfeld
ARTICLE/CHAPTER TITLE: Is biodiversity good for your health?
JOURNAL/BOOK TITLE: Science
VOLUME: 349
DATE: 2015
PAGES: 235-236

AUTHOR: Krupnick, G. A.
ARTICLE/CHAPTER TITLE: Conservation of tropical plant biodiversity: What have we done, where are we going?
JOURNAL/BOOK TITLE: Biotropica
VOLUME: 45
DATE: 2013
PAGES: 693-708

AUTHOR: McCauley, D. J.
ARTICLE/CHAPTER TITLE: Selling out Nature
JOURNAL/BOOK TITLE: Nature

VOLUME: 443
DATE: 2006
PAGES: 27-28

AUTHORS: McLachlan, J. S., J. J. Hellmann and M. W. Schwartz
ARTICLE/CHAPTER TITLE: A framework for debate of assisted migration in an era of climate change
JOURNAL/BOOK TITLE: Conservation Biology
VOLUME: **21**(2)
DATE: 2007
PAGES: 297-302

AUTHORS: Mekonnen, M. M. and A. Y. Hoekstra
ARTICLE/CHAPTER TITLE: Four billion people facing water scarcity
JOURNAL/BOOK TITLE: Science Advances
VOLUME: 2
DATE: 2016
PAGES: e1500323

AUTHORS: Pleguezuelos, J. M., M. Feriche, J. C. Brito and S. Fahd
ARTICLE/CHAPTER TITLE: Snake charming and the exploitation of snakes in Morocco
JOURNAL/BOOK TITLE: Oryx
VOLUME: **52**(02)
DATE: 2016
PAGES: 374-381

AUTHORS: Ricciardi, A. and D. Simberloff
ARTICLE/CHAPTER TITLE: Assisted colonization is not a viable conservation strategy
JOURNAL/BOOK TITLE: Trends of Ecological Evolution
VOLUME: 24(5)
DATE: 2009
PAGES: 248-253

AUTHOR: Soulé, M. E.
ARTICLE/CHAPTER TITLE: What is Conservation Biology?
JOURNAL/BOOK TITLE: BioScience
VOLUME: 35
DATE: 1985
PAGES: 727-734

AUTHORS: Watkins, G. G. and M. A. Donnelly
ARTICLE/CHAPTER TITLE: Biodiversity research in the Neotropics: From conflict to collaboration.
JOURNAL/BOOK TITLE: Proceedings of the Academy of Natural Sciences of Philadelphia
VOLUME: **154**(1)
DATE: 2005
PAGES: 127-136

ADDITIONAL RESOURCES

None.