

SEMESTER AT SEA COURSE SYLLABUS

Colorado State University, Academic Partner

Voyage:	Fall 2017
Discipline:	Natural Resources
Course Number and Title:	NR 370 Coastal Environmental Ecology
Course Level:	Upper Division
Faculty Name:	Robert W. Smith
Semester Credit Hours:	3

Pre-requisites: One (1) fundamentals of chemistry course
Per instructor: Prerequisite is waived

COURSE DESCRIPTION

Over half the world's population lives in coastal areas. Whereas coastal areas encompass only about 10% of the earth's land surfaces the oceans account for approximately 75% of the earth's surface. In coming years, the coastal population is expected to rise, further intensifying the pressure human activity has on coastal zones. It is the coastal areas where land and ocean meet. Activities in the oceans and on land have an impact on each other. It is the intent of this course to study and appreciate how coastal zone activities impact the oceans and how what occurs in, and under, the ocean may impact the coasts. This course will combine the study of the physical environment with human activity. We will look at both man's activities in the coastal and offshore environment as well as the laws and regulations developed at the national, regional, and international levels. Balancing human use of coastal and marine areas with preserving and maintaining a healthy ecosystem is a challenging task. Urban development leads to natural habitat loss, including the loss of wetlands, marshlands, mangrove forests, and sand dunes. While certain regions of the ocean have rich fishing grounds, overfishing and non-enforcement in many parts of the world has led to the demise of fish. Pollution of water and air adds to the problem in both the coastal and marine environments. The list of natural resources found in coastal and marine areas include both living and non-resources such as oil, gas, sand, gravel, minerals, and fish. Climate change imposes a major threat for coastal areas. Coral reefs and low-lying islands are especially susceptible to climate change as sea levels rise. How countries and the international community address these dynamic processes will be a major focus in this course.

Course Goals and Objectives:

- To provide a fundamental understanding of coastal and offshore marine areas by studying oceanic processes, both natural and man-made.
- To assess the activities occurring both in the coastal zone and in the oceans to gain an appreciation of the inter-relationship between the two areas.
- To assess how countries and the international community approach management of the valuable resources and eco-systems of both the coastal areas and offshore marine areas taking into consideration national and international laws, regulations, and enforcement.
- To hone writing and speaking skills in order to present succinct descriptive and analytical briefing papers and oral presentations on the readings, field lab, and "in country" experiences.

REQUIRED TEXTBOOK

Author: Kaiser, Attrill, et al,
Title: Marine Ecology: Processes, systems, and impacts,
Publisher: Oxford University Press
ISBN-13: 978-0-19-922702-0
Date/edition: 2011/2nd Edition
Cost: approx. \$ 79

TOPICAL OUTLINE OF COURSE

9 Sept: Depart Bremerhaven, Germany

Class 1: Introduction

- A. Administrative details (grading system, assignments, briefing memos, exams)
- B. Course expectations and goals
- C. Ecology: What is it?
- D. Introduction to the “Geographic/Ecological Moment”
- E. Maps

Readings: Text: 1-12, 33-39; Henrichsen 11-21; UN Statement on Ecosystem Approaches, July 21, 2010; WWF/IUCN, pp. 5-10. Editorial: Can we win the Race Against Marine Biodiversity Extinction?

Class 2: Ecology Overview

- A. Population Dynamics and the coastal environment
- B. Earth-Sun Relationship
- C. Patterns of the Marine Environment

Readings: Text 1-14, Henrichsen 22-31

Memo 1 due (Memo on editorial, hard copy)

15-18 Sept: Barcelona and Valencia, Spain

Class 3: Key Issues: Man and the Earth

Movie: The 11th Hour

- Class 4**
- A. Patterns of the Marine Environment, Part 2
 - B. Bio-diversity

Readings: Text: 15-29

Memo 2 due (Synopsis and Issues Raised in Movie, 11th Hour)

23 September No classes, Study day
Class 5 A. Primary Production Processes
B. Ghana ecology issues

Readings: Text Chapter 2

Test No. 1 (Map quiz and short answers)

Class 6: Fisheries

Readings: Text: 134-140, 194-199, Abel and McConnell 18-25

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27-30 Sept: Tema, Ghana

2 October No classes, Study Day

Class 7: World Fisheries, part 2

1. Producers and Consumers
2. Issues: By-catch, endangered species, regulations
3. Sustainability

Reading: Text: 357-376 ; Henrichsen 66-70 ; WWF/IUCN, pp. 13-22;

Class 8: A. Plastics and other bad things in the Ocean
B. Ocean "Dead Zones"

Readings: Henrichsen, pp. 32-51; NY Times Editorial on Microbeads

7-12 Oct: Cape Town, South Africa

Class 9: Coral Ecosystems

Readings: Text: 305-323; Henrichsen 48-52;

Class 10: Mauritius Marine Coastal Ecology: Mangroves and Coral

Reading: Text: 277-304; Henrichsen 46-47

16 Oct: No classes Study Day

Class 11: A. Estuaries and Marshes
B. Aqua culture and artisanal fisheries
C. Prepare for field class

Readings: Text: 143-167, 377-400.

19 Oct: Port Louis, Mauritius

Field Class: Mauritius Ecology: Mangroves

- Class 12:** A. Debrief of Field Class
B. Shipping
C. Ports and Harbors
D. IMO

Readings: Text: 417-18; Henrichsen, pp. 52-55

22 October No classes, Study Day

- Class 13:** A. Student presentations of Field Class (1/3 class will give oral presentations)
B. Pollution: Marine and Land-based
C. Aquatic Invasive Species

Readings: Text: 401-420; Henrichsen 32-52; IUCN, pp. 23-27.

Memo 3– Field Class memo on Mangroves/ Coral DUE

25-30 Oct: Cochin, India

31 October No classes Study Day

Class 14: Mid- term (through Class 12)

4-8 Nov: Yangon, Myanmar

Class 15: Energy from the Sea

- A. Oil and Gas Industry
- B. Wind
- C. Tides and Waves

Readings: Text: Henrichsen 56-62

11 November No Classes Study Day

Class 16: Man-made structures and the ecosystem: Building Dams and Canals

- Suez Canal
- Panama Canal
- Egypt's Aswan Dam
- China's Three Gorges Dam

Reading: Nile Travis, "Engineering Modernity: The Aswan Low Dam and Modernizing the Nile," Western Oregon University, Capstone Paper.

14-18 November Vietnam

Class 17: Polar Regions

1. Arctic
2. Antarctica

Readings: Text: 325-352; Henrichsen 82-85

21 November No Classes Study Day

Class 18: A. Ecological Moment Presentations by part of the Class B. Climate change

Readings: Text: 421-426; Henrichsen 80-85; IUCN pp. 27-29

Memo 4 Geographic/Ecological Moment memo DUE

14-18 Nov: Shanghai, China

Class 19: Movie: Six Degrees Could Change the World

2-6 Dec: Kobe, Japan

Class 20: Law of the Sea: Zones of Maritime Jurisdiction

Class 21: A. Student presentations of Movie Six Degrees (part of the class) B. Conservation: What does it mean? C. Management plans: International & Regional approaches (UNEP Regional Programs)

Readings: Text: 429- 438; Henrichsen: 92-105; IUCN, pp. 31-60

Memo 5 due (Synopsis and Issues Raised in Movie, Six Degrees)

Class 22: Management plans: National

Readings: Text: 430-449

12 December No classes Study Day

Class 23: Maritime disputes: The ecosystem is the loser

- A. Maritime Boundaries
- B. Sovereignty Disputes
- C. Piracy

Readings: Henrichsen 86-91; Mora, Caldwell, Birkeland, and McManus, “Dredging in the Spratly Islands: Gaining Land but Losing Reefs,” *PLOS Biology*, March 31, 2016.

Class 24: Movie: World in the Balance or **Inconvenient Truth or Disaster in Japan**

19 Dec: Honolulu, Hawaii

18 December No classes Study Day

Class 25: Final Exam

23 Dec: San Diego, California

FIELD COMPONENT

One of the objectives of this course is to understand the environment at the coast and how it is influenced by human activity both on land and in and under the ocean.

The field component comprises twenty percent of the course work. Students are asked to keep notes of their field excursions, both on their formal field class as well as independent travel in country, and to submit, for grading, two memos including the memo on the field class during the semester, as shown in the syllabus. These memos will focus on a particular excursion(s) and incorporate the readings and lectures in the analysis. Field trip experiences may also find their way into mid-term and final exams. Students should also be prepared to discuss in class their field trip experiences and this will count towards the class participation component of the grade.

The field class will be “The Coastal Ecology of Mauritius: An Introduction to Mangrove Forests and Coral Reefs”. Mangrove forests and coral reefs provide structural complexity to near shore marine habitats and are key to the biodiversity of species in a tropical marine ecosystem like Mauritius. Human development, clearing of the forests for building damages the mangrove forests. Coral reefs are threatened by ocean acidification, and from other human activities that cause habitat degradation. During the day the students will be meet and be briefed by Mauritian officials who study the mangroves and coral reefs and who attempt to manage and conserve them. The intent is that part of the day will be spent exploring the mangrove forests from kayaks and to learn first-hand the importance of these forest and that they are endangered. Throughout the day Mauritian officials will describe the success, and failures, of their national management schemes to conserve the mangrove forests, as well as the coral reefs. Time permitting, it is hoped the students will be able to don snorkel gear to see for themselves how vibrant, or not, the coral is near the Mauritian coast. By the end of the day the students should have gained an appreciation of what is working and what may not be working with respect to the conservation of this special part of the Mauritian ecological system. And, they hopefully will be able to critique the Mauritian efforts and to offer suggestions, by way of their briefing memorandum once back on the ship, on how management schemes and approaches could be improved.

METHODS OF EVALUATION / 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).

The final grade will consist of a map test, a mid-term exam, final exam, three memos, and class participation. The weight of each component will be discussed during the first class period. Class participation will be defined as attending all classes, periodically commenting and posing questions either in class or via e-mails, making it evident you are keeping up with the readings and engaging in the field component of the class.

IE 272 Ecology (Fall 2017) Grading		
Product	% of Final Grade	No. Points
Test 1 (map/short answer quiz)	8	40
Test 2 (Mid-term)	15	75
Test 3 (Final Exam)	30	150
Memo 1 (Editorial)	4	20
Memo 2 (Movie-11 th hour)	5	25
Memo 3 (Field class memo)	15	75
Memo 4 (Geographic/ Ecological Moment)	10	50
Memo 5 (Movie- 6 degrees)	5	25
Class Participation	8	40
Course total	100	500

Final Grades		
Grade	Percent range	Point range
A	93+	465+
A-	90 - 92.5	450 -464.5
B+	87.5 - 89.5	437.5 - 449.5
B	83.5 - 87	417.5 - 437
B-	80.5 - 83	402.5 - 417
C+	78.5 - 80	392.5 - 402
C	69.5 - 78	347.5 - 392
D	56.5-69	282.5-347
F	56 and below	282 and less

ATTENDANCE/ENGAGEMENT IN THE ACADEMIC PROGRAM

Attendance in all Semester at Sea classes, including the Field Class (which must constitute at least 20% of the total grade in a course), 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 memo from the student's home institution verifying the accommodations received on their home campus 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.

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 LIBRARY LIST

Abel, D.C., and R.L. McConnell. 2010. Environmental Oceanography: Topics and Analysis. Jones and Bartlett Publishers, Boston. ("Abel and McConnell")

Barnes, R.S.K, and Hughes, R.N, An Introduction to Marine Ecology, 3rd Edition, Blackwell Publishing, 1999 (Barnes and Hughes).

Hinrichsen, Don, The Atlas of Coasts and Oceans, University of Chicago Press, 2011 ("Hinrichsen")

Mora, Caldwell, Birkeland, and McManus, "Dredging in the Spratly Islands: Gaining Land but Losing Reefs," PLOS Biology, March 31, 2016.

G. Carleton Ray and Jerry McCormick-Ray, Coastal- Marine Conservation: Science and Policy, Blackwell Publishing, 2004 ("Ray and Ray").

United Nations Division on Oceans and the Law of the Sea, "ECOSYSTEM APPROACHES", http://www.un.org/Depts/los/ecosystem_approaches/ecosystem_approaches.htm.

WWF/IUCN Marine Policy, Creating a Sea Change, 1998 & 2016. (WWF/IUCN)