

## SEMESTER AT SEA COURSE SYLLABUS

Colorado State University, Academic Partner

<b>Voyage:</b>	Spring 2019
<b>Discipline:</b>	Natural Resources
<b>Course Number and Title:</b>	NR 130 Global Environmental Systems
<b>Division:</b>	Lower
<b>Faculty Name:</b>	Mark Wenig
<b>Semester Credit Hours:</b>	3

**Prerequisites:** None

### COURSE DESCRIPTION

The environment we live in, the Earth's ecosystem consists of four natural subsystems, the atmosphere, the biosphere, the hydrosphere and the geosphere. All those systems interact with one another forming a careful balance of energy and matter exchange. The current balance among these complex interactions makes it possible for life to flourish on Earth. Human activities have influenced the biosphere significantly over the past 150 years. Since all spheres are part of the same interconnected system, changes in any sphere will ultimately affect the other spheres as well.

This course examines the human influence on global environmental systems with an emphasis on understanding the major biogeochemical cycles. It investigates how human activities (e.g. deforestation, changes in biodiversity, air pollution, desertification) can disrupt environmental processes and the ability of our global environment to support and sustain life. Important feedback mechanisms between biological and physical processes and the atmosphere are also considered in detail. The course explores how natural and managed ecosystems respond to a changing climate and altered resource availabilities while taking prospects for the future into consideration. Traveling through various countries and climate zones will allow us to observe the changing characteristics of each sphere in different environments.

### LEARNING OBJECTIVES

By completing this course, at the end of the study voyage, the students will have acquired relevant knowledge in the area of global environmental systems and gained the skills to be able to:

- understand the Earth from a system science approach.
- discuss the interdisciplinary links between the geosphere, hydrosphere, atmosphere, biosphere and how system characteristics and interactions vary globally.
- recognize changes that may occur with anthropogenic forcing.
- employ scientific methods and tools to study Earth's systems.
- think critically and correct misconceptions surrounding environmental issues.
- have a comparative understanding of systems based on ports visited.

## **REQUIRED TEXTBOOKS**

AUTHOR: Skinner, BJ and B Murck

TITLE: The Blue Planet: An introduction to earth system science.

PUBLISHER: Wiley

ISBN #: 978-0-471-23643-6 or 978-0-470-55648-1 (binder ready version)

DATE/EDITION: 2011 3<sup>rd</sup> edition

## **TOPICAL OUTLINE OF COURSE**

### **Depart Ensenada, Mexico – January 5**

#### **A1—January 7:**

Introductions, Syllabus, and Overview of the course

What are global environmental systems and how do we study our planet Earth?

Assign student groups for the student presentations and group discussions

Readings: Chapter 1

#### **A2—January 9:**

Energy

Energy sources and cycles

Readings: Chapter 2

#### **A3—January 11:**

Matter

What the Earth is made of

Preparation for Hawaii

Readings: Chapter 3

### **Honolulu, Hawaii—January 12**

#### **A4—January 14:**

Space and Time

The solar system

Student presentation about environmental systems using the example of Hawaii

Readings: Chapter 4

January 16—International Date Line crossing (Lost Day)

#### **A5—January 17:**

The Geosphere (part 1)

The tectonic cycle

Readings: Chapter 5

### **Study Day (No Class)—January 19**

#### **A6—January 20:**

The Geosphere (part 2)

Earthquakes and volcanoes  
Readings: Chapter 6

**A7—January 22:**

The Geosphere (part 3)  
The rock cycle  
Preparation for Kobe  
Readings: Chapter 7

**Kobe, Japan — January 24-28**

**A8—January 29:**

The Hydrosphere (part 1)  
The hydrologic cycle  
Student presentation about environmental systems using the example of Japan  
Preparation for Shanghai and Hong Kong  
Readings: Chapter 8

**Shanghai, China — January 31 - February 1**

**In-Transit — February 2-3**

**Hong Kong, SAR — February 4-5**

**A9—February 6:**

The Hydrosphere (part 2)  
The Cryosphere  
Snow and ice, glaciers and polar caps  
Student presentation about environmental systems using the example of China  
Preparation for Ho Chi Minh City  
Readings: Chapter 9

**Ho Chi Minh City, Vietnam — February 8-13**

**A10—February 14:**

The Hydrosphere (part 3)  
The ocean basins, circulation, waves and tides  
Student presentation about environmental systems using the example of Vietnam  
Readings: Chapter 10

**Community Programming (No Class)—February 16**

**A11—February 17:**

The Atmosphere (part 1)  
Composition and structure  
Preparation for Yangon  
Readings: Chapter 11

**Yangon, Myanmar — February 19-23**

**A12—February 24:**

The Atmosphere (part 2)

Wind and weather systems

Student presentation about environmental systems using the example of Myanmar

Readings: Chapter 12

**A13— February 26:**

The Atmosphere (part 3)

Climate system

Evidence and effects of climate change

Preparation for Cochin

Readings: Chapter 12

**Cochin, India — February 28 – March 5****A14—March 6:**

The Biosphere (part 1)

Life, death and evolution

Student presentation about environmental systems using the example of India

Readings: Chapter 14

**Community Programming (No Class) — March 7****A15—March 9:**

The Biosphere (part 2)

The Earth's ecosystems

Preparation for Port Louis

Readings: Chapter 15

**Port Louis, Mauritius — March 11****A16—March 12:**

The Biosphere (part 3)

Population and biodiversity

Student presentation about environmental systems using the example of Mauritius

Readings: Chapter 16

**A17—March 14:**

The Anthroposphere (part 1)

A fifth subsystem describing human impact on Earth's systems

Resource cycle

Readings: Chapter 17

**A18—March 16:**

The Anthroposphere (part 2)

Mineral and energy resources

Preparation for Cape Town

Readings: Chapter 18

**Cape Town, South Africa – March 18-23**

**A19—March 24:**

The Anthroposphere (part 3)

Human Impacts on air quality and climate change

Student presentation about environmental systems using the example of South Africa

Readings: Chapter 19

**A20—March 26:**

The Anthroposphere (part 4)

Human Impacts on the ocean and land

**A21—March 28:**

Measurement Techniques for Deriving Environmental Parameters (part 1)

How to measure parameters needed for monitoring and modeling changes in the geosphere and hydrosphere

Preparation for Tema and Takoradi

**Tema, Ghana – March 30 - April 1**

**Takoradi, Ghana – April 2-3**

**A22—April 4:**

Measurement Techniques for Deriving Environmental Parameters (part 2)

How to measure parameters needed for monitoring and modeling changes in the atmosphere and biosphere

Student presentation about environmental systems using the example of Ghana

**A23—April 6:**

Feedback mechanisms and interaction between Earth subsystems

Manmade changes to the careful balance between environmental systems

Mitigation, adaptation and intervention

Hand in port journals

**Study Day (No Class) – April 8**

**A24— April 9:**

Comparing Impressions of the Different Countries on this Voyage Related to Environmental Systems

Discussion of port journals

Preparation for Casablanca

Student presentation about environmental systems using the example of Morocco

**Casablanca, Morocco – April 11-14**

**A25—April 15: Final Exam**

## Arrive Hamburg, Germany – April 19

### 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 & Assignment

[Field Class proposals listed below are not finalized. Confirmed ports, dates, and times will be posted to the Spring 2019 Courses and Field Class page when available.]

**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.

Proposal Title #1: Air quality monitoring in Shanghai

Country: China

Idea: Lab tour of the air quality measurement site at the Department of Environmental Science and Engineering at Fudan University

Objectives:

- Learn about the measurement techniques used to monitor air quality in China
- Meet environmental researchers and gain experience in pollution detection and data collection.
- Understand the influence of atmospheric pollution on daily life in China, especially in a megacity like Shanghai
- Learn about China's efforts to improve air quality

Proposal Title #2: Air quality monitoring in Hong Kong

Country: Hong Kong

Idea: Tour of the laboratories and research facilities at the School of Energy and Environment at City University of Hong Kong

Objectives:

- Learn about the measurement techniques used to monitor air quality in Hong Kong
- Meet environmental researchers and gain experience in pollution detection and data collection.
- Understand the influence of atmospheric pollution on daily life in China, especially in a megacity like Hong Kong
- Learn about China's efforts to improve air quality

Each student will write a 2-3 page paper highlighting how the field class fits into the topics covered during class.

### Independent Field Assignments

Students are required to keep a port journal of observations in each port related to the course content. The Journal entries should consist of observations of features related to the Earth's systems, i.e. biomes, importance of the port for the city, climate, weather, vegetation, population, pollution, land use, etc. Guidelines will be provided during the first lecture. At the end of the semester a collaborative port journal will be assembled from all students' journals and discussed.

Port-of-call reports and student presentations:

Students in groups will be assigned one port-of-call country. In that country, students should note anything they find relevant to our course, and should go more in depth than the port journal. Additional questions will be provided specific to their country.

Each group will prepare a 20 minutes power point presentation for their port and topic. Every student in the group should present a part of the talk. This presentation should include photos and sketches. Each group will also turn in an essay (1-2 pages of text). After the presentations the other students are encouraged to ask questions. In order to be able to participate in the discussion, all students should keep their eyes open in all ports we visit and notice differences to their assigned country.

The students will be graded on their creativity and ability to apply concepts that have been covered in class to their observations, as well as the quality of their essays and power point presentations.

## METHODS OF EVALUATION

The contribution of the different evaluation methods is as follows:

Class participation (tutorial questions during most lectures, $\approx 1.5\%$ each lecture for $\approx 20$ lectures)	30%
Expedition log	10%
Group presentations and papers	20%
Field class	20%
Final exam	20%

## 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:

<u>Excellent</u>	<u>Good</u>	<u>Satisfactory/Poor</u>	<u>Failing</u>
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](mailto: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 BOOKS FOR THE LIBRARY FILM REQUEST ELECTRONIC COURSE MATERIALS ADDITIONAL RESOURCES**

Students will be expected to use internet resources while in port to augment their port journals and port-of-call reports.