

SEMESTER AT SEA COURSE SYLLABUS

Colorado State University, Academic Partner

Voyage:	Spring 2019
Discipline:	Natural Resources
Course Number and Title:	NR 150 Oceanography (Section 3)
Division:	Lower
Faculty Name:	Mark Wenig
Semester Credit Hours:	3

Prerequisites: None

COURSE DESCRIPTION

The ocean is the cradle of life and covers 75% of our planet. It is essential for balancing the climate, plays a vital role for the wellbeing of our ecosystems, and is indispensable to the global economy.

The course will examine the natural systems that impact our oceans, including geological, meteorological and biological processes. Students learn about interrelationships between these aspects of the ocean, and how these interrelationships govern earth processes. We will also weigh the consequences of human activity and global changes on ocean systems. The course begins with a description of the ocean basins and the mechanisms of their evolution. The physical and chemical properties of seawater are considered next and the role of the oceans in elemental cycles will be examined. The discussion of physical oceanography includes large-scale patterns, ocean circulation, as well as small-scale phenomena such as waves. The geology of the coastal ocean, beaches, and estuaries leads into a discussion of the ocean's major communities and the biotic and physical factors structuring them. Topics of current interest (global warming, coastal development etc.) are presented throughout the course. The course's reading and lecture material will be supplemented by case studies and first hand investigation into marine science issues while we are traveling the oceans of the world.

LEARNING OBJECTIVES

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

- understand the importance of oceans in the evolution of Earth and its life
- describe the basic geological, physical and biological features and processes of the oceans.
- recognize the impacts of humans on the oceans and changes that may occur with anthropogenic forcing
- apply scientific tools and methods oceanographers use to study the ocean
- develop an appreciation for the diversity and importance of life in the oceans.
- become inspired to explore current issues in oceanography around the world

REQUIRED TEXTBOOKS

AUTHOR: Tom Garrison
TITLE: Oceanography: An Invitation to Marine Science
PUBLISHER: Cengage Learning
ISBN #: 1-305-10516-8
DATE/EDITION: 2017/ 9th edition

TOPICAL OUTLINE OF COURSE

Depart Ensenada, Mexico – January 5

A1—January 7:

Introduction
Syllabus and overview of the various ports and countries we will be visiting
Assign student groups for the student presentations and group discussions
Instructions how to maintain the expedition log
The origin of the ocean
Readings: Chapter 1

A2—January 9:

History of Oceanography
Environmental issues and sustainability
Scientific discoveries on marine expeditions
Readings: Chapter 2

A3—January 11:

Earth Structure and Plate Tectonics
How were the Hawaiian Islands formed?
Preparation for Honolulu
Readings: Chapter 3

Honolulu, Hawaii—January 12

A4—January 14:

The Ocean Basins
The topography of the ocean floor
Student presentation about oceanographic specifics of Hawaii
Readings: Chapter 4

January 16—International Date Line crossing (Lost Day)

A5—January 17:

Ocean Sediments
Composition of the ocean floor
Readings: Chapter 5

Study Day (No Class)—January 19

A6—January 20:

Ocean Structure

Density and temperature distribution in the ocean

Readings: Chapter 6

A7—January 22:

The Properties of Sea Water

Preparation for Kobe

Readings: Chapter 7

Kobe, Japan — January 24-28

A8—January 29:

The Earth's atmosphere

Composition and dynamics of the atmosphere

Student presentation about oceanographic specifics 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:

Ocean Dynamics

Circulations and currents

Student presentation about oceanographic specifics of China

Preparation for Ho Chi Minh City

Readings: Chapter 9

Ho Chi Minh City, Vietnam — February 8-13

A10—February 14:

Atmospheric Dynamics

convection, gravity waves, jet streams, global and regional-scale circulations

Student presentation about oceanographic specifics of Vietnam

Community Programming (No Class)—February 16

A11—February 17:

Ocean/Atmosphere Interaction (part 1)

Sea level rise, El Niño, tropical cyclones and hurricanes

Preparation for Yangon

Yangon, Myanmar — February 19-23

A12—February 24:

Ocean/Atmosphere Interaction (part 2)

Gas exchange, monsoon

Student presentation about oceanographic specifics of Myanmar

A13— February 26:

Ocean Waves

Physical characteristics of water waves, generation of waves, breaking waves and Tsunamis

Preparation for Cochin

Readings: Chapter 10

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

Tides

Generation and effects of tidal waves

Student presentation about oceanographic specifics of India

Readings: Chapter 11

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

Coasts

Human uses, impacts and adaptations

Preparation for Port Louis

Readings: Chapter 12

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

Sea ice

Formation and properties of sea ice, ice bergs and ice sheets

Student presentation about oceanographic specifics of Mauritius

A17—March 14:

Life in the Ocean (part 1)

Nature of life in the ocean and its classification based on evolutionary heritage

Environmental factors influencing marine organisms

Readings: Chapter 13

A18—March 16:

Life in the Ocean (part 2)

Primary Producers

Preparation for Cape Town

Readings: Chapter 14

Cape Town, South Africa — March 18-23

A19—March 24:

Life in the Ocean (part 3)

Marine Animals

Student presentation about oceanographic specifics of South Africa

Readings: Chapter 15

A20—March 26:

Life in the Ocean (part4)

Marine Communities

Readings: Chapter 16

A21—March 28:

Marine Resources

Petroleum and natural gas resources and renewal sources of marine energy

Biological resources

Preparation for Tema and Takoradi

Readings: Chapter 17

Tema, Ghana — March 30 - April 1

Takoradi, Ghana — April 2-3

A22—April 4:

Measurement Techniques for Deriving Oceanic Parameters

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

Student presentation about oceanographic specifics of Ghana

A23—April 6:

The Ocean and the Environment

Natural and anthropogenic marine pollution

What is the danger of marine pollution and what can (should) be done?

Hand in expedition logs

Readings: Chapter 18

Study Day (No Class) — April 8

A24— April 9:

Comparing Impressions of the Different Countries on this Voyage Related to Oceanography

Discussion of expedition logs

Preparation for Casablanca

Student presentation about oceanographic specifics 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:

Maritius Oceanography Institute (MOI) or Hanauma Bay and Honolulu Aquarium, Hawaii

Learning objective:

- a) to have students seek out a diversity of marine processes, formations and organisms through direct interaction.
- b) observe marine life and compare to physical conditions
- c) tour of the MOI or the Honolulu Aquarium
- d) snorkel in coral reef habitats and to gain understanding of the diversity of coral reef organisms
- e) observe, record and compare species from above and below the tideline

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 in groups will maintain an expedition log for all days at sea. The log will include all available measurements and observations relevant for the course, e.g. weather, bottom depth, sea state, oceanographic parameters and marine wildlife sightings. A photo of the ocean should be taken every day around noon to get an idea of the sea state and the color of the ocean. They should also document how the ocean changes as we go from the open ocean across the continental shelf and into harbor at some ports or the reverse route. The second part of the entry should be descriptive or illustrative in nature, documenting the 'at sea' experience. Any experiences in port that add to the understanding of the marine environment are welcome in the log. The logs will be evaluated on the basis of completion and effort. At the end of the semester a collaborative expedition log will be assembled from all students' logs 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, which could include coastal erosion, manmade structures to prevent erosion, seafood consumption and seafood offered in stores and markets, aquaculture, fishing practices etc. In addition, each group will get questions 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 ≈ 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 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 require access to shipboard charts, oceanographic, and weather data. Field activity dependent, students will need appropriate gear to explore shorelines- closed toe shoes, swimwear, snorkeling gear, collection materials, etc. Students will be expected to use internet resources while in port to augment their port-of-call reports and presentations.