

BIO460 INTRO TO MARINE SCIENCE
With LABORATORY
Fall 2006

Lecture: TR 1050-1205 in SC165

Lab: October 13-18 field trip

Instructor: Dr. Charles Acosta

Office: SC346

Office hours: TR 12:30-1:30 W 2:00-4:00

Phone: 859-572-5300

Email: acostac@nku.edu

Course Overview

The marine environment is the single largest ecosystem on planet Earth, but our understanding of its importance has only just begun. This course is designed to give students a thorough introduction to the major subdisciplines that comprise Marine Science. Students will study fundamental aspects of physical and chemical oceanography, marine geochemistry, marine ecology, and the biology of marine organisms. Specific lecture topics will include:

- the physical properties of water and seawater chemistry
- ocean circulation including waves, tides, currents, and fluid dynamics
- geography and geology of the ocean basins
- primary and secondary productivity
- marine ecosystem ecology
- distribution, diversity, and adaptations of marine plants and animals.
- marine policy and conservation issues.

Students will also be exposed to potential career fields in marine science and education.

Grading

Lecture and Laboratory grades will be combined to calculate a final letter grade for the course. Final grade will be the cumulative score out of 500 total points (A=450; B=400; C=350; F<295).

<u>Lecture</u>	<u>Points</u>
Exam 1	100
Exam 2	100
4 Research Papers	100
Final Exam	100

Laboratory

Field Project Report	100
----------------------	-----

Students will abide by the University Honor Code and the Code of Student Rights and Responsibilities (www.nku.edu/~deanstudents/policies.htm). Students with disabilities are entitled to the resources of the Disabilities Services Center (www.nku.edu/~disability).

MARINE SCIENCE LECTURE

Required Text

- *Invitation to Oceanography* by Paul Pinet (4th edition, Jones & Bartlett Publishers)
- Oceanlink (<http://www.jbpub.com/oceanlink/4e/>)

Classroom lectures will consist of presentations, exercises, videos, and interactive discussions. All materials presented in class may be included on lecture exams. Assignments will be posted on the Marine Science course site on **BlackBoard**. Supplemental materials and exercises will be drawn directly from the website “**Oceanlink**” that accompanies the textbook.

Research Papers

- Readings from the primary literature on selected topics in Marine Science will be assigned. Students should be prepared to read additional materials to fully understand the assigned paper. Write a summary of each paper in the form of a “Review” paper in scientific journals (each of the four assignments is worth 25 points toward a final grade). Each written assignment should have a concise review of the contents of the paper and should address the specific questions posed in the assignment posted on Blackboard.
- Format: Papers should be formatted as in the example below. Pages should be numbered. Use 12 point font, double spaced.

- Title Page:

(title) “**Chemical defenses of sponges and corals**”
(your name) Jack Coostoe
(course) BIO 460 Intro to Marine Science
(semester) Fall 2006

- Pages 2-3:

Abstract

Tropical coral reefs contain communities with some of the highest levels of biodiversity on earth. Predation is a major ecological process shaping these communities. Yet, some of the most conspicuous and seemingly vulnerable animals are studiously avoided by predators. This includes the sponges and gorgonians....

- Pages 3-4:

Discussion question: Why are these chemical compounds unique?

The chemicals produced by sponges are both inhibitory and

Literature Cited

O’Neal W. and J.R. Pawlik. 2002. A reappraisal of the chemical and physical defenses on Caribbean gorgonian corals against predatory fishes. *Marine Ecology Progress Series* 240:117-126.

MARINE SCIENCE LABORATORY

Suggested Reading:

- *Ecology of Atlantic Shorelines*, Mark Bertness.
- *Life in the Chesapeake Bay*, Lippson & Lippson.
- *Chesapeake Bay: Nature of the Estuary*. Christopher White.
- <www.chesapeakebay.net> and related links

The mandatory laboratory to accompany BIO460 Intro to Marine Science consists of an intensive field trip to the Eastern Shore Laboratory of the Virginia Institute of Marine Science (College of William & Mary) at Wachapreague, Virginia. The Lab runs October 13–18, 2006. Students are responsible for securing permission to be excused from their other classes during Friday Oct. 13 and Wednesday Oct. 18.

A lab fee of \$100 is due Sept. 12, 2006. The fee covers dorm accommodations, meals, and boat use; transportation to the lab will be provided by the NKU Department of Biology.

The field trip is designed to introduce students to the diverse marine environments of the Chesapeake Bay and the coastal Atlantic Ocean. We will have daily lectures and conduct physical, chemical, and biological sampling of nearshore marine environments. We will take excursion trips to beaches, intertidal creeks, open ocean, and the Chincoteague National Wildlife Refuge. **Material covered in field lectures will be included on Lecture exams.**

- Students will conduct group projects that will involve sampling and collecting data. Each student will submit a lab report which includes a discussion of relevant primary literature and a data summary. Each group will discuss its findings in class. Papers should be formatted as in the example below. Pages should be numbered. Use 12 point font, double spaced.

<u>Section</u>	<u>No. of Pages</u>
Title Page (project title, date, course, your name)	1
Introduction (introduce topic, related literature, and your project)	2-3
Materials and Methods (state what sampling methods were used and where you sampled)	1-2
Results and Discussion (state what you found including data in tables; what it tells us about the project topic)	2-3
Literature Cited (list all references you mentioned)	as needed

TENTATIVE SCHEDULE FALL 2006

<u>Date</u>		<u>Topic</u>	<u>Chapter</u>
August	22	Introduction – “Ocean World”	1
	24	Ocean exploration	1
	29	Ocean characteristics	2
	31	Ocean topography and plate tectonics	3
September	5	Sedimentation	4
	7	Seawater properties	5
	12	Seawater properties; Paper #1 due	5
	14	Ocean-atmosphere interaction	6
	19	Thermohaline circulation	6
	21	Waves	7
	26	Tides – “Tidal Seas”	8
	28	Biotic zones	9
October	3	EXAM 1 (Chap. 1-8)	
	5	Trophic webs	10
	10	Primary productivity; Paper #2 due	10
	12	Coastal environments	11
	13-18	LAB:Field Trip –“Open Ocean” “Coasts” “Seasonal Seas”	
	19	Tropical ecosystems	12
	24	Lab Report & Presentations due	
	31	Temperate and Polar ecosystems	12
November	2	Benthic communities	13
	7	Pelagic communities	13
	9	Deep-ocean communities; “The Deep”	13
	14	EXAM 2 (Chap. 9-13)	
	16	Marine Resources	14-15
	21	- THANKSGIVING BREAK -	
	23	“Deep Trouble”; Paper #3 due	14-15
	28	Fisheries	14-15
	30	Pollution	14-15
December	5	Marine policy	
	7	Marine careers; Paper #4 due	
	14	FINAL EXAM 10-12	