

## HON 270 Science and Technology

### *Science on the Connecticut Coast: Investigations of an Urbanized Shoreline*

Fall Semester

Class Location: Jennings Hall Room 335

Class Time: Wednesday 9:10-11:00 am; Friday 9:00-12:00 pm

#### **Instructors**

Dr. James Tait, *Department of Earth Sciences*

214-E Morrill Hall

X 25838; [taitj1@southernct.edu](mailto:taitj1@southernct.edu)

Office Hours: T 1:30 – 4:00, W 11:00 – 12:00, Th 3:05 – 4:35

Dr. Vincent Breslin, *Department of Science Education and Environmental Studies*

340 Jennings Hall

X 26602; [breslinv1@southernct.edu](mailto:breslinv1@southernct.edu)

Office Hours: T 3-4:30, W 11:00-12:30, Th 11-12:30

#### **Rationale**

This course focuses on the shoreline of southern Connecticut and Long Island Sound. A variety of coastal environments are examined in detail including sandy beaches, salt marshes, estuaries and coastal dunes. We will explore the geological, biological, physical and chemical processes at work along the shoreline and relate them to environmental as well as social, economic and political issues. Impacts of storms and hurricanes, the threat to local wetlands by sea level rise, and generation of dead zones on the sea floor of the sound are among the issues the class will address.

Students will examine and discuss topics including the historical development of New Haven harbor; the aesthetic value of natural settings and habitat; the economic value of natural and coastal resources, and the environmental degradation resulting from improperly designed and managed industrial and residential development in harbor ecosystems. We will explore questions including: How do we balance the need for economic development with the desire for open space preservation? How have past development/industrial activities affected the quality of New Haven Harbor ecosystems? How can seemingly thriving natural habitats exist within a commercially active urban harbor?

Students will participate in classroom, laboratory and field activities (including a boat trip in the harbor to collect water, sediment and biological samples) to arrive at answers to these questions.

## **Course Goals:**

This course is designed to teach science by pursuing the following goals:

- 1) Doing science using scientific methodology,
- 2) Emphasizing field experience,
- 3) Conducting quantitative analyses,
- 4) Writing for clarification of thinking and communication of ideas, and
- 5) Stressing the societal relevance of scientific investigation.

## **Specific Objectives:**

On completion of this course, students will be able to:

- 1) Use the scientific method to examine questions concerning their observations of the coastal environment, including the formulation of testable hypotheses and the collection of field and laboratory data to evaluate their hypotheses,
- 2) Recognize and discuss the unique aspects (geological, biological, and chemical) of inland and coastal habitats including sandy beaches, salt marshes and coastal dunes,
- 3) Identify and quantify specific sources, fates and impacts of pollutants (primarily metals and floatable debris) entering coastal waters, and
- 4) Identify the causes and consequences of global climate change, including the social, economic and environmental impacts due to hypothesized increased storminess and coastal flooding.

## **Grades**

Three quizzes (announced/unannounced) will be given during class and will address material presented during lectures, readings, and field/lab activities and will count towards 25% of the course final grade. Students will also be expected to submit written reports concerning the field and laboratory activities (50% of final grade). Specific format of these reports will be addressed during class. All reports must be typed! Participation will account for 25% of the final grade (includes attendance, participation in class discussion, quality of effort in field and laboratory work, being on time to class and excursions, etc.).

## **Class Policies**

Due to the hands-on nature of this class, attendance is mandatory. We expect students to attend all class sessions and be prepared to participate. Missed classes will result in a loss of 5% of your total grade (half a grade). If you miss more than 3 sessions,

this will result in failure of the course. We realize that genuine emergencies arise. If you must miss class due to a serious emergency, please notify an instructor *before* class (phone, email, FAX). Written assignments must be submitted on when due.

Students should also be aware of the SCSU policy concerning academic honesty (SCSU Student Handbook). Cheating/Plagiarism will not be tolerated! Violators of this policy will fail this course.

If you need course adaptations or accommodations due to a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please notify an instructor ASAP.

## HON 270 Science and Technology

### *Science on the Connecticut Coast: Investigation of an Urban Shoreline*

#### Topic/Activity

#### Module 1

#### Connecticut Landscapes and Watersheds

Introduction to Class; Plate Tectonics and the Wilson Cycle;  
Geology, Rocks and Minerals

**Lab Activity** - Rocks and Minerals

*Readings:* Press and Siever, Chapter 3 (pp. 1-8).

Tectonic History of CT, Ice Ages, Long Island Sound, and  
Connecticut's Coastal Landscape

**Lab Activity** – Rocks and Minerals Continued

*Readings:* Bell, Chapter 8 (pp. 9-39).

Weathering and Watersheds: Undoing Tectonics

**Field Trip** – Geology of CT Coast

Coast Week – West Haven Beach Debris and Data Collection  
12-4 pm. (*Mandatory*)

#### Module 2

#### Coastal Processes and Environments (Habitats) of Long Island Sound

Tidal Wetlands: Physical Processes and Ecology

**Field Trip** – West Haven marsh (HT 11:50 am)

*Readings:* Dreyer and Niering, Tidal Marshes of Long Island Sound (booklet).

Beaches and Dunes

**Field Trip** - Hammonasset State Beach (LT 11:51 am)

*Readings:* Patton and Kent, Chapters 2-3 (pp. 40-86).

Living with the Coast: Storms and Coastal Erosion

**Lab Activity** – Topographic Surveys

*Reading:* Patton and Kent, Chapter 1 (pp. 87-110).

Review/Data Processing/Report writing

**Field Trip** - Storm Surge Surveys

### Module 3

#### New Haven Harbor (Social, Science and Economics)

New Haven Harbor – History, Economic Importance.

**Field Trip** – New Haven Colony Historical Society

*Reading:* New Haven: An Illustrated History, Chapters 4 and 5 (pp. 111-142).

**Field Trip** – Harbor Cruise (*R/V Sounder*)

Sample sediments, organism and water collection

Split class sessions (9-12 pm and 1-4 pm)

*Reading:* Boehnke and Delumyea, Experiment 2 (pp. 143-152).

Harbor Pollution – Sources and Solutions

**Lab Activity** – (Class split sessions [JE 314]: 10–1 pm; 1-4 pm).

Prepare sediment for copper analysis, sediment classification.

*Readings:* Breslin and Sañudo-Wilhelmy (pp. 163-174). Boehnke and Delumyea, Experiment 10 (pp. 153-162).

Marine Pollution

**Lab Activity** – Sediment analysis for copper

*Reading:* Sound Health 2001: Status and Trends in the Health of Long Island Sound (handout). EPA LIS Office Publication (pp. 1-15).

### Module 4

#### Global Connections: Climate and Ecosystem Change

Energy Use and Consequences of Global Climate Change

*Readings:* Botkin and Keller, Chapter 16, Fossil Fuels and the Environment (pp. 175-191). Mayer, Chapter 12, Global Climate Change (pp. 192-208).

#### Thanksgiving Recess

Global Warming and Sea Level Rise

**Lab/Field Activity** – LIS Sea Level Rise and Marsh Inundation

*Readings:* Warren and Niering ( pp. 209-216).

Student group research and practice presentations

**Class Activity:** Student led discussions

### Final Exam Week

Regional and Global Climate Change: Solutions and Consequences  
Group final presentations

## **Bibliography**

Bell, Michael, The Face of Connecticut, Bulletin No. 110, State Geological and Natural History Survey of Connecticut, Hartford, CT, 1985.

Bohenke, N.D. and R. Del Delumyea. 2000. Laboratory Experiments in Environmental Chemistry. Prentice-Hall Inc. Upper Saddle River, NJ. pp. 279.

Botkin and Keller, Environmental Science: Earth as a Living Planet 3<sup>rd</sup> Edition, John Wiley and Sons, Inc. New York, NY. 2000.

Breslin, V.T. and S. Sañudo-Wilhelmy. High spatial resolution sampling of metals in the sediment and water column in Port Jefferson Harbor, NY. *Estuaries* 22:3 669-680. 1999.

Bush, M.B. Ecology of a Changing Planet. Prentice Hall, Upper Saddle River, New Jersey, 2000.

Dreyer, Glenn and Niering, William, eds., Tidal Marshes of Long Island Sound, Bulletin No. 34, Connecticut College Arboretum, New London, CT., 1995.

Kane, J. Will Global Warming Swamp Long Island? Newsday Editorial, July 30, 1995.

Mayer, R.J. 2001. Connections in Environmental Science, A Case Study Approach. McGraw-Hill Publishers, New York, NY, 2001.

Patton, Peter and Kent, James, A Moveable Shore: The Fate of the Connecticut Coast, Duke University Press, Durham, NC, 1992.

Press, Frank and Siever, Raymond, Understanding Earth, W. H. Freeman and Company, New York, 1994.

Rauber, P. Heat Wave, Sierra Magazine, September/October. 1997.

Schneider, David, The Rising Seas in *Scientific American*, March 1997, pp. 112-117.

Schumway, F. and R. Hegel. 1987. New Haven An Illustrated History. Windsor Publications. pp. 175.

Sound Health 2001, Status and Trends in the Health of Long Island Sound. US EPA Long Island Sound Office, Stamford CT. 2001.

US EPA. Global Warming and Our Climate Change, Answers to Frequently Asked Questions. Office of Air and Radiation, EPA 430-F-00-011, April, 2000.