# GLS 225: Estuaries and Pollution

**3 Credits, DII**

**Salem State University Department of Geological Sciences**

**Course Syllabus: Fall 2013**

Class: Wednesday, Friday 9:25 - 10:40; Meier Hall Room #237

Instructor: Brad Hubeny Office: Meier Hall #331A

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Office Hours: T 4:00 – 5:00 Web: http://w3.salemstate.edu/~bhubeny

W 12:00 – 1:30; F 11:00 - 12:30

OR by appointment.

# Course Description

Estuaries are coastal water bodies that have large economic, ecologic, and aesthetic value, however many are currently being adversely affected by human actions. This class is designed to introduce the dynamics of estuaries in order to understand the interactions between the geosphere, hydrosphere, and biosphere in these coastal water bodies. These systems will be investigated with regard to current natural and human influences on New England’s estuaries. A field trip will be offered to expose students to environments discussed in class. Three lecture hours per week. Prerequisites: GLS 100 or permission of Department Chairperson.

**Course Goal**

After taking this course students will have a solid grasp of geological, physical, and chemical aspects of New England’s estuaries, and will be able to make informed decisions as to management of these resources.

**Course Objectives**

After completing this course students will be able to

- synthesize processes specific to estuarine environments

- explain interactions and feedbacks between different estuarine systems

- predict environmental effects of natural and anthropogenic actions in estuaries

- understand the science needed to make informed decisions regarding management of estuaries

# Want to Chat?

My favorite part of teaching at SSU is getting to know my students. I encourage all of you to come and chat with me about anything that is on your mind, be it academic or otherwise. Feel free to contact me by any means at any time with questions, comments, concerns, or anything else. I am available during office hours (T 4:00 – 5:00; W 12:00 – 1:30; F 11:00 - 12:30), and I can be flexible in scheduling a meeting time for anyone who cannot make it to office hours.

# Textbooks and Readings

We will utilize a number of sources for readings this semester, including textbooks, online textbooks, and peer-reviewed scientific articles. The two required textbooks should be available at the SSU bookstore or from online sources. These texts are:

**Waves, Tides and Shallow-Water Processes**, Second Edition [Paperback]

Open University (Author), Gerry Bearman (Editor)

Publisher: Butterworth-Heinemann; 2 edition (April 11, 2000)

ISBN-10: 0750642815

ISBN-13: 978-0750642811

**Marine Pollution** [Paperback]

R. B. Clark (Author)

Publisher: Oxford University Press, USA; 5 edition (June 7, 2001)

ISBN-10: 0198792921

ISBN-13: 978-0198792925

Additional readings will be assigned from two online textbooks that are free and provided by M. Tomczak (*Shelf and Coastal Oceanography* and *An Introduction to Physical Oceanography*). You can access these texts at: <http://www.es.flinders.edu.au/~mattom/ShelfCoast/index.html> and <http://www.es.flinders.edu.au/~mattom/IntroOc/index.html>, respectively.

Finally, scientific articles or additional readings will be posted on Canvas as pdf files that you can either read on your computer or print out and add to your course notebook.

Required readings are listed in the class schedule and will be updated throughout the semester.

# Additional Resources

We will use a Canvas site for posting items associated with class work and assignments. You can login at: https://elearning.salemstate.edu/login

There are a BUNCH of really cool web pages that address estuarine issues. A few follow below:

<http://omp.gso.uri.edu/ompweb/doee/science/intro.htm>

<http://co-ops.nos.noaa.gov/ports.html>

<http://www.salemsound.org/index.htm>

<http://www.mass.gov/envir/massbays/>

**Coursework and Grading**

I plan to run this class as an experiential learning environment in which you will investigate many topics in a hands-on sort of way. As such, I will be emphasizing performance in activities and assignments that take place in class and at home. The course has 5 required components that will be used to calculate your final grade. These include two exams, experiential in class and take home assignments, a final research project, and attendance. The final research project will consist of an evaluation of a specific estuary on the planet. This should include a full description of the characteristics of the estuary, as well as any potential anthropogenic threats to the estuary.

The following shows the proposed breakdown for final grades in this class:

**Exam #1**  20%

**Exam #2** 20%

**In Class and Take-home Assignments** 35%

# Final Project 20%

**Attendance**  5%

You will have **two exams** in this class, each worth 20% of you grade, for a total of 40% of the final grade. The mid-term exam will take place during the week of October 19. The final exam is scheduled for Tuesday, December 15 from 8:00 – 10:00 AM. Both exams, including the final exam, are required, and you are responsible for taking each exam during the scheduled time. If extreme circumstances prohibit you from taking the exam at the scheduled time, please see me BEFORE THE EXAM. I will make a decision on a case-by-case basis on how to handle this. Exams will be cumulative, however they will each focus on the material since the previous exam. Exams will consist of questions that are designed to test both your KNOWLEDGE and UNDERSTANDING of the material. Assignments will prepare you for the exams.

**In Class and** **Take Home Assignments** are integral to my class, and help you to understand concepts important in estuarine pollution. Assignments may be exclusively in-class, a combination of take-home and in-class, a combination of field work and take-home, or Canvas exercises. These assignments will allow you to dig more deeply into a topic than we have time to do in class. We will have such assignments assigned regularly throughout the semester. These assignments will be distributed during class time, and *if you miss class, you miss the assignment*. Your average grade for these assignments will count for 35% of your final grade in this class.

You will be responsible for producing a **final project** for GLS 225. In this final project you will research a pollution issue in an estuary of your choosing. You will draft a report describing the estuary, the pollution problem, steps that have been taken to address this problem, and your analysis of the appropriateness of the action. We will conduct a peer-review process of your work to refine your writing. You will also give a poster presentation during the final exam period to the class to educate your peers on your findings. Your grade for all components of the final project will count for 20% of your final grade in GLS 225. More details on the final project will be available later in the semester.

Finally, **attendance** will be taken and your attendance percentage will count for 5% of your final grade. There is a strong relationship between attendance and grade in my class, and I expect that you will make all classes.

Your final grade will be calculated as a percentage using the above breakdown. Conversion to a letter grade will be made as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Final Grade | Final Percentage | Final Grade | Final Percentage |
| A | 94 – 100% | C | 74 – 76% |
| A- | 90 – 93% | C- | 70 – 73% |
| B+ | 87 – 89% | D+ | 67 – 69% |
| B | 84 – 86% | D | 64 – 66% |
| B- | 80 – 83% | D- | 60 – 63% |
| C+ | 77 – 79% | F | 0 – 59% |

**Field Trips**

# Since the study of estuaries is largely a field science, each of you will be required to participate in one field excursion on the Geological Sciences’ Department research vessel, *R/V Valhalla*. I will offer four trips, each of which will each gather data that we will use in class activities. Tentative dates and research objectives are as follows:

|  |  |  |
| --- | --- | --- |
| Trip | Date/Time | Objective |
| 1 | Monday, September 23: 8:00 – 12:00 | Geochemical (T/S) characterization of the Danvers River Estuary |
| 2 | Monday, September 23: 1:00 – 5:00 | Sub-bottom geophysical survey of Danvers River Estuary sediments |
| 3 | Monday, October 7: 8:00 – 12:00 | Salem Harbor geochemical monitoring buoys |
| 4 | Monday, October 7: 1:00 – 5:00 | Sediment coring in Salem Harbor |

# Attendance Policy

I expect that students will attend all class periods. Although I do not have a mandatory attendance policy, there are parts of your grade that are dependent on your being in class. Therefore, although not required, attendance is expected, and lack of attendance will have negative consequences on your final grade. If you have a personal emergency or are sick, please contact me **BEFORE** the class that you will miss so that we can discuss your options.

**Late Work**

Each student is responsible for completing all course requirements by the assigned due dates, and for keeping up with the material covered in class. LATE ASSIGNMENTS will not be accepted. Therefore, if you do not pass in an assignment on the due date, you will receive a 0% for that assignment. If you need an extension for an extenuating circumstance, it is your responsibility to talk to me about it BEFORE THE DUE DATE so that I can decide whether or not to grant such an extension. Late assignments will negatively impact your overall grade, so I strongly advise you to PASS IN ASSIGNMENTS ON TIME!!

**Additional Points**

In regards to conduct, academic and otherwise, students should be aware that the Student Code of Conduct as established by Salem State College governs their actions. Students are responsible for knowing and obeying these rules. Salem State policies and procedures are enforced in this course.

**I reserve the right to modify the course structure and content of the course as may prove necessary.**

# Students with Disabilities Statement

Salem State College is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids, and adjustments. Any student who had a documented disability requiring an accommodation, aid, or adjustment should speak with me immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities (978-542-6217) and obtain appropriate services.

# Critical Emergency Statement

In the event of a college-declared critical emergency, Salem State College reserves the right to alter this course’s plan. Students should refer to [www.salemstate.edu](http://www.salemstate.edu) for further information and updates. The course attendance policy stays in effect until there is a college-declared critical emergency.

In the event of an emergency, please refer to alternative educational plans for this course that will be posted on the course’s Canvas page. Students should be prepared for a campus emergency by keeping all course materials with him/her at home so that they are accessible in the case of an emergency.

**Geology 225 LECTURE SCHEDULE Hubeny**

**Estuaries and Pollution Fall 2013**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Dates | Topic | Reading |
| 1 | September 4, 6 | Introduction to Estuaries and Concept of System Science; Classification of Estuaries from Geologic, Physical, and Chemical Perspectives | SCO: Ch 1  IPO: Intro 2  SCO: Ch 11, 13 |
| 2 | September 11, 13 | Salinity, Temperature, Density, and Stratification | IPO: Lecture 3, 5  BP: Ch 11 (p. 244-248) |
| 3 | September 18, 19 | Tides and Waves | OU: Ch 2, 1 |
| 4 | September 25, 27 | Estuarine Circulation, Flushing, and Residence Times | BP: Ch 11 (p. 248-252)  SCO: Ch 15  Pilson, 1985 |
| 5 | October 2, 4 | Sedimentary Processes, Patterns, and Records | OU: Ch 3, 4, 6  SCO: Ch 17 |
| 6 | October 9, 11 | Sedimentary Processes, Patterns, and Records | OU: Ch 3, 4, 6  SCO: Ch 17 |
| 7 | October 16, 18 | Estuarine Biosphere; Exam #1 | TBD |
| 8 | October 23, 25 | Introduction to Pollution | Clark: Ch 1, 2 |
| 9 | October 30,  November 1 | Oxygen Demanding Waste | Clark: Ch 3 |
| 10 | November 6, 8 | Conservative Contaminants and Metals | Clark: Ch 5 |
| 11 | November 13, 15 | Petroleum Hydrocarbons | Clark: Ch 4 |
| 12 | November 20, 22 | Halogenated Hydrocarbons | Clark: Ch 6 |
| 13 | November 27, 29 | Thanksgiving Recess |  |
| 14 | December 4, 6 | Dredging and Heat Pollution | Clark: Ch 8 |
| 15 | December 11 | Exam #2 |  |
| Final Exam Week | December 13  11:00 – 1:00 | Final Project Presentations |  |

Reading Key:

* SCO: **Shelf and Coastal Oceanography**, M. Tomczak
* IPO: **An Introduction to Physical Oceanography**, M. Tomczak
* BP: **The Blue Planet**, B.J. Skinner
* OU: **Waves, Tides and Shallow-Water Processes**, Open University
* Clark: **Marine Pollution**, R. B. Clark