

EAS 4420/6120: Environmental Field Methods

Spring 2012

Lectures: L1175 EST - MWF 10:05-10:55 am

Laboratory: L1155 EST - M 12:05-2:55 pm

I. Instructors

Dr. Martial Taillefert
e-mail: mtaillef@eas.gatech.edu
phone: (404) 894-6041
office: ES&T 1238
office hours: MWF 11:00-12:00.

Teaching Assistant:
Jordon Beckler
e-mail: jordon.beckler@eas.gatech.edu
Office: ES&T 1160
office hours: TTh: 11-12:00 or by appointment

II. Overview and Objective

The objective of this course is to introduce students to the acquisition and analysis of environmental field data. The course will take place around Skidaway Island and focus on a coastal region that represents a transition from land to the ocean. Two field trips will be conducted during the semester to collect samples and data in salt marsh, estuarine, and shallow subsurface environments, as well as from the atmosphere around the island. To minimize conflicts with other courses, these field trips will have to be conducted mostly during weekends. However, **two school days will be used (Feb. 13 and Mar. 9) for these field trips.**

A variety of physical, chemical, and biological environmental parameters will be collected and analyzed during these field trips. Undergraduate students will be assigned individual projects that relate to their field of expertise and pertain to these environments. Graduate students will write a brief proposal (i.e., two page long), due at the end of the second week of the course, that describes their own research project for the course.

EAS 4420/6120 emphasizes completion of individual interpretations of diverse data sets, individual reports, a group report, and a group presentation to EAS faculty members. Each student will be responsible for an aspect of the group research that pertains to his/her expertise and will contribute to the final report and presentation compiled during the final week of classes.

Three or four assignments and a mid-term exam are scheduled for this course. Assignments will include regular homework on material covered in class, two individual presentation on a specific subject related to the course, and individual reports after the field trips. Individual reports will be brief (no more than 10 pages, not including figures and references, in standard 12 point font and double line spacing) and have the format of a scientific paper with introduction, material and methods, results, discussion, and conclusions sections. All reports must contain scientific references. Individual reports have to be returned on the due dates to count for 100% credit. A 20% penalty per day late will be enforced.

The laboratory component of the course will include a few lectures on the state-of-the-art of taking and reporting measurements, laboratory and field safety, cleanliness and behavior in the laboratory, calculations, and other subjects pertaining to the course. The laboratory time should be used to set-up experiments, instruments, or methods and process samples and data collected in the field.

III. Course Material

There is no official textbook assigned the course. Course material will consist of class notes, handouts, and assigned readings.

IV. Grading

- 20% Individual reports
- 10% Final report
- 20% Laboratory activities
- 10% Mid-term exam (no final exam)
- 15% Problem sets and related assignments
- 15% Presentations
- 10% Field activities, group interaction, contribution.

V. Course Outline

1. Introduction: social context of environmental problems, key regulations

- Impact of coastal development
- Nutrient input, runoff, eutrophication, hypoxia
- Atmospheric composition and pollution in coastal environments
- Climate change and meteorological impact, storms, tsunami

2. Geological evolution and structure of the coastal environment

- Deposition processes
- Mineralogy
- Hydrology
- Oceanic basins

3. Atmospheric measurements

- Aerosols and gases
- Satellites for oceanographic measurements (sea surface temperatures, chlorophyll a, turbidity, ocean color, wind forcing)
- Satellites for land surface and near-surface data (carbon, hydrology, soils, topography, meteorology, radiation and clouds, snow, sea ice, oceans, vegetation)

4. Geophysical measurements

- Hydraulic conductivity (grain size analysis, water levels, permeameter analysis, DC resistivity, EM induction)
- Geomorphology (ground penetrating radar, seismic tomography)
- Water composition (conductivity, salinity, temperature)
- Water currents (ADCPs)

5. Geochemical measurements

- Water composition (oxygen, cation, anions, pH, alkalinity)
- Conductivity, electroneutrality, and chemical speciation calculations
- Soil and sediment texture and composition
- Redox biogeochemical processes

VI. Tentative Schedule of Class

- ^Jan. 9-11-13: Introduction and Organization**
Class contact information
Science section responsibilities (identify students' interests)
Report support responsibilities (identify leading student)
Field trips logistics (food preference; Emergency form; Liability/Weaver form; What to bring for field trips)
Assignments for next two weeks: Subjects picked by students from a list and literature search on subject
Student presentations: should be around 40 minutes on the research subject of the student. Presentations should include an introduction, objective, methods, results, discussion, and conclusions. Ten minutes will be dedicated to a discussion after each presentation.
Power point presentations are presented to Dr. Taillefert a lecture ahead (Wednesday for Friday lecture) for feedback. Final presentation has to be e-mailed to Dr. Taillefert up to an hour before class.
- Jan. 16: No class**
- Jan. 18-20: Chapter I**
Lectures
- Jan. 23-25-27: Chapter I cont.**
Deadline: Homework 1 (Jan. 23)
Deadline: Graduate Student Proposal due (Jan. 27)
Lectures
First student presentation (Jan. 27)
- Feb. 30-1-3: Chapter II**
Lectures
Student assignment for Chapter II (Feb. 3)
- Feb. 6-8-10: Chapter II cont.**
Lectures
Second student presentation (Feb. 10)
- *Feb. 10-13: Field trip 1**
Site visit to Skidaway Institute of Oceanography, Savannah (GA).
- Feb. 15-17: Chapter III**
Lectures
Student assignment for Chapter III (Feb. 17)
- ^Feb. 20-22-24: Chapter III cont.**
Lectures
Mid-Term (Feb. 24)

EAS 4420/6120: Environmental Field Methods Spring 2012

- Feb. 27-29-Mar. 2: Chapter IV**
Lectures
Deadline: Draft of first individual report due (Feb. 29)
Third student presentation (Mar. 2)
Student assignment for Chapter IV (Mar. 2)
- Mar. 5-7: Chapter IV cont.**
Deadline: Second draft of individual report due (Mar. 7)
Lectures
Fourth student presentation (Mar. 7)
- *Mar. 8-11: Field trip 2**
Second Site visit to Skidaway Institute of Oceanography, Savannah (GA). Leave Tech on Mar 8 late afternoon. Cruise on RV Savannah, Mar. 9; work on the site Mar. 10-11 and return to ATL on Mar. 11.
- ^Mar. 12-14-16: Chapter V**
Lectures
Student assignment for Chapter V (Mar. 16)
- Mar. 19-23: Spring Break**
- ^Mar. 26-28-30 Chapter V cont.**
Lectures
Deadline: Second individual report due (Mar. 30)
Fifth student presentation (Mar. 30)
- Apr. 2-4-6 Chapter V cont.**
Lectures
Student assignment for Chapter V (Apr. 6)
- Apr. 9-11-13: Presentation and Discussion of Individual Projects**
All students (each student presents their data and discuss their results)
Sixth student presentation (Apr. 13)
- Apr. 16-18-20: Group Report Discussion and Organization in Class**
Deadline: Final individual report due (Apr. 20)
- Apr. 23-25-27: Final Presentation (April 27 at 3:30 pm) and Group Report Due**

*We will leave Tech late in the afternoon of Feb. 10 and Mar. 7. Feb. 13 and Mar. 9 are school days intended for field work. If these two days conflict with other classes, send Dr. Taillefert an e-mail with the course name and number, and the name and e-mail of the professor at least a week in advance. Dr. Taillefert will ask permission to excuse your absence during these 2 days only.