

# Syllabus

## Sustainability Concepts and Methods: Mercury in Tampa Bay

PHC 6934 (ref# 15933) / CNG 6933(ref# 11277) / Geog 6119 (ref # 18993)

Spring 2008

- Course Description:** An interdisciplinary introduction to the concepts of sustainability and research methods for studying sustainability. The case focus of the course will be mercury in the Tampa Bay area.
- Objectives:** Upon completion of this course the student should be able to:
- 1) Discuss different perspectives on sustainability and identify aspects that affect sustainability (of a project, problem, etc).
  - 2) Identify and integrate research approaches (and/or experts) across disciplines.
  - 3) Identify and conduct some environmental sampling and analysis methods for Hg.
  - 4) Describe mercury speciation and cycling.
  - 5) Discuss the value (and limitations) of environmental sampling and analysis.
  - 6) Design and implement a simple population survey.
  - 7) Discuss the value (and limitations) of population survey methods.
  - 8) Apply simple systems modeling to an environmental problem.
  - 9) Discuss the value (and limitations) of systems modeling.
- Pre-Requisites:** College Calculus, College Chemistry
- Credit Hours:** 3 units
- Dates / Times:** MW 2 - 3:30. January 7 to April 23
- Location:** NES 103
- Format:** Face-to-face classroom instruction, laboratory and field experiences
- Attendance / Participation:** Students are expected to regularly participate in the class through asking and answering questions. If you do not attend, it is not possible to participate.

### Instructor Information:

Name:	Amy Stuart, PhD	Maya Trotz, PhD	Fenda Akiwumi, PhD
Office	COPH 1116	ENG 220	NES 314
Office Hours	T, Th 3 - 4:30 pm	T 3-5 pm, W 10-11:30 am (tent.)	T, Th 1 - 2:30 pm
Phone	974-6632	974-3172	974-6887
Email	astuart@hsc.usf.edu	matrotz@eng.usf.edu	fakiwumi@cas.usf.edu

**Preferred method of contact:** The instructors' preferred method of contact is face-to-face during office hours (to be announced during the first week of class). We will also respond to email and phone messages on a limited basis. Reply times may vary up to several days.

**Course Outline:**  
*(Tentative)*

It is recommended that students read the materials listed *before* the given lecture. Reading lists will be provided for each topic.

Part 1: Sustainability Concepts

Week 1 (Jan 7, 9): Introduction and concepts (Stuart)

- Syllabus review and Institutional Review Board (IRB), (Jan 7)
- Definitions and perspectives, Components (environmental, economic, social/cultural), Human connections to the physical and natural world, Spatial and Temporal scales, Equity issues (Jan 9)

Week 2 (Jan 14, 16): Methods, tools, and case studies

- Life cycle assessment (industrial ecology), Footprint calculators, Eco indicators, Target plot (Jan 14, Trotz)
- Case Studies and class project planning (Jan 16, Akiwumi)

**Project Planning:** During week 2, the class will be divided into groups for work and writing on the final class project on Tampa Bay Hg. The tentative group is below.

- Group 1: Introduction, Motivation, and Discussion sections
- Group 2: Methods, results, discussion for environmental sampling and analysis
- Group 3: Methods, results, discussion for population surveys
- Group 4: Methods, results, discussion for system modeling

Part 2: Environmental Sampling and Analysis (Trotz)

Week 3 (Jan 23): Hg occurrence and fate

- Hg species, Hg biogeochemistry, Fate in various samples (biota, soil, water, air, hair, blood, urine)

Week 4 (Jan 28, 30): Analytical Methods for Hg determination

- Emphasis on AFS, AA, Total, inorganic Hg

Week 5 (Feb 4, 6): Experimental Methods

- Safety procedures, Taking field samples (water, sediment), Processing field samples in the laboratory, Analyzing field samples for Hg

Week 6 (Feb 11, 13): Laboratory Analysis

***There will also be two required 3-hour labs and one field sampling trip to be completed in coordination with instructor.***

Part 3: Population Survey Methods (Akiwumi)

Weeks 7 (Feb 18, 20)

- Methods (quantitative, qualitative and mixed methods) and theory in research, The survey research method, the questionnaire as survey instrument

Weeks 8 (Feb 25, 27)

- Risk perception theory, fishing, fish contamination and risk perception (readings)

Weeks 9 (Mar 3, 5)

- Population surveys – field data collection

Weeks 10: Spring Break - No class

Weeks 11 (Mar 17, 19)

- Collation and analysis of data

***There will also be two required 3-5 hour field data collection trips to be completed in coordination with instructor.***

Part 4: Systems Modeling (Stuart)

Week 12 (Mar 24, 26): Systems Thinking

- What is a system? Big-picture thinking. Emergent properties. System as the cause. Temporal dynamics. Interdependency, feedbacks, non-linearity. Systems behavior and outcomes modes.

Week 13 (Mar 31, Apr 2): Modeling Basics

- What is a model? Conceptual and box diagrams. Conservation principles. Stocks and flows. Scale and units. Rates of change.

Week 14 (Apr 7, 9): Model Building

- Representing model building blocks. Connecting variables and subsystems. Spatial arrays. Time behavior. Parameter estimation. Overall work flow diagram

Week 15 (Apr 14, 16): Model Testing and Application

- Face validity. Conservation and units check. Numerical error testing. Sensitivity and uncertainty analyses. Benchmarking. Evaluation. Results analysis.

Meetings: Monday classes will be lecture style and will meet in the lecture room. Wednesday classes will be hands-on computing skills labs with STELLA, and will meet in the computer room (ENB 228).

Part 5: Wrap-up

April 21 Final wrap-up discussion; Team work to finish projects

April 23 Project presentation by students; Student survey for course assessment

April 30 **Final class project due**

**Reading  
Materials:**

Required Text: Simon Dresner. *The Principles of Sustainability*. Earthscan Publications Ltd. 2002  
(Available in the main university bookstore and the health sciences bookstore.)

Other reading materials will be provided via blackboard, library course reserve, or as class handouts (at the discretion of the instructors).

**Grading:**

Scale:	Class Participation:	20%
	Project Participation, Writing, and Presentation:	40%
	Individual Assignments and Quizzes	40%

The course will be graded on a curve, with natural divisions in the earned scores leading to divisions in the letter grades. + and – grades will be used in this course.

Types of Assessments: Class participation: We expect all students to regularly participate in the class through asking and answering questions, discussing content, and being present and involved in laboratory and field work.

Project participation, writing, and presentation: Each student is expected to enthusiastically and professionally contribute to the team project through research, writing, and presentation.

Individual Assignments and Quizzes: There will be regular homework assignments and quizzes over the course of the semester.

Safe-Assignment and other plagiarism checking methods may be used to ensure academic honesty.

Late and Make-up Policies: Students are expected to turn in assignments on time and to be present to participate in the laboratories, field surveys, and to take quizzes. If you cannot be present for the scheduled dates, you should inform the instructor as soon as possible, so that alternate arrangements can be made. Some university regulated excuses include disability-related conditions, observance of major religious holidays, and official participation in university-sponsored athletic events. Students who anticipate missing an exam for these reasons should provide the official paperwork or written notice (for religious observance) by the second class meeting. If you miss a class or anticipate missing a class, you should contact a fellow student to get any needed information or announcements of assignment or quizzes.

### **Other Classroom and University Policies:**

Academic Dishonesty and Disruption of the Academic Process: Academic dishonesty or disruption of the academic process in any form, including plagiarism, will not be tolerated. See the following for a discussion of forms and consequences, at <http://www.sa.usf.edu/handbook/academics/ImportantAcademicPolicies.htm> or [http://catalog.grad.usf.edu/currentpdf/USF\\_Graduate\\_Catalog\\_2005\\_2006\\_section6.pdf](http://catalog.grad.usf.edu/currentpdf/USF_Graduate_Catalog_2005_2006_section6.pdf)

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Student Handbook: <http://www.sa.usf.edu/handbook/>

Student Conduct: USF Student Rights/Responsibilities: <http://www.sa.usf.edu/handbook/rights/StudentRightsResponsibilities.htm>

USF Student Code of Conduct: <http://www.sa.usf.edu/handbook/rights/StudentCodeofConduct.htm>

Holidays and Religious Observances: <http://www.sa.usf.edu/handbook/policies/ReligiousPracticesPolicy.htm>

### **Additional Resources for Students:**

Library Resources: 'How to Find a Journal Article': <http://itt.usf.edu/publichealth/library/tutorial/index.html>  
USF Library Resources and Services: <http://www.lib.usf.edu/>  
Shimberg Health Sciences Library: <http://hsc.usf.edu/library/>

Plagiarism: Tutorial on Plagiarism for Students: <http://www.cte.usf.edu/plagiarism/plag.html>

Creating Citations: <http://web.lib.usf.edu/usflibraries/help-styleguides.html>

Using Bibliographic Management Software: [http://itt.usf.edu/publichealth/library/bms/bms\\_v5\\_interface.html](http://itt.usf.edu/publichealth/library/bms/bms_v5_interface.html)