COURSE INFORMATION AND OBJECTIVES
EARTH SYSTEMS SCIENCE I
PGEOG250 Fall 2008
Professor Allan Frei

CLASS SCHEDULE:
LECTURES:  Tuesday / Friday, 3:45-5:00, Room 1022 Hunter North
LABS:  Section 1: Friday, 2:10-3:00, Room 1090B Hunter North
        Section 2: Tuesday, 2:10-3:00, Room 1090B Hunter North

PROFESSOR FREI CONTACT INFORMATION:
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E-mail  afrei@hunter.cuny.edu
Tel.    212-772-5322
Office Hours: by appointment

COURSE DESCRIPTION & OBJECTIVES
In this course we learn to think of our planet as a system. A system consists of several
components that interact with each other, sometimes in very complicated fashions. The
components of the earth system that we will consider include the atmosphere, the
hydrosphere, the lithosphere, and the biosphere. While each of these components can, and
should, be studied in more detail in separate courses, here we focus on interactions
between them.

The three main objectives of this course are:

1. To introduce students to “systems thinking” in the context of the earth system.
   Systems-thinking is critical in all areas of study, and particularly in the fields of
   environmental studies and earth sciences.

2. To introduce students to quantitative analysis. In the lab portion of this course we will
   be introduced to some of the concepts necessary to study environmental systems in a
   quantitative fashion. Labs are meant to provide students with a number of identifiable
   skills that can be applied in other courses as well as in work environments.

3. To provide students with a sufficiently broad, yet integrated, understanding of the earth
   system to identify particular areas or sub-disciplines that they would like to pursue in
   more detail.

COMPUTER LABS
Computer labs will be held once per week in room 1090B North. Labs will consist of
exercises designed to introduce students to some of the concepts and skills necessary to
study environmental systems in a quantitative fashion. These include basic mathematical
concepts, as well as using computer simulations, or models, to understand the earth from
a “systems dynamics” perspective. STELLA® modeling software will be used in
modeling exercises. No previous experience in computer modeling or STELLA software
is expected, although basic familiarity with the Windows operating system, MS WORD and MS EXCEL, is expected. Computer labs will be provided to you.

Most labs take 2 weeks. Labs are expected to be emailed to the professor before the beginning of the next lab.

GROUP WORK – is allowed for all labs except labs 1, 2, and 5. If students choose to work in groups, students must: (1) inform the professor before the due date which students are working together; and (2) hand in only one lab per group, with all students names on the lab.

PREREQUISITES
Each student must have passed at least one 100-level science course, or have permission of the instructor. Basic familiarity with the Windows operating system, and Microsoft Word and EXCEL, are assumed. Students will be taught to use additional software for running computer simulations in the laboratory.

REQUIRED TEXT BOOKS
Students must obtain their own copies of:

ADDITIONAL READINGS AND LAB MATERIAL will be provided, including excerpts from the following:
Lab exercises that have been designed specifically for this course

GRADES
Grades are based on lab work, two midterm exams, one final exam, and four low-impact assignments (two labs and two written).

Labs 24%
Midterm 1 20%
Midterm 2 24%
Final 24%
Low impact 8%

EXAMS
Three exams will be given, two in-class midterm exams and one final exam. See the syllabus for exam dates and information about which chapters will be covered.

LOW IMPACT ASSIGNMENTS
There are 2 low impact labs (labs 1 and 2), and two low impact assignments. Low impact assignments are graded on a pass/fail basis. All students are expected to pass and get full
credit for low-impact assignments. The only way a student can fail to get credit is (a) if you do not hand it in on time, or (b) you are obviously not trying to fulfill the assignment. If you want credit, all you have to do is try. The purpose of these low impact assignments is to allow students to think about particular issues without the pressure of grades.

**ATTENDANCE**

Attendance is required at all lectures and labs. Up to two unexcused absences from lectures will be tolerated. Only one unexcused absence is allowed from lab sessions. Every unexcused absence after the maximum allowable limit will result in a decrease of 5% from the student’s grade in the course.
COURSE SCHEDULE  
EARTH SYSTEMS SCIENCE  
PGEOG250, Fall 2008  
This schedule is tentative (Subject to change)  
“chapters” refers to Kump, Kasting, and Crane text unless otherwise specified  
“B&M” refers to chapters from Bowler and Morus, which will be provided to you

<table>
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<tr>
<th>SESSION #</th>
<th>DATE</th>
<th>DAY</th>
<th>LECTURES</th>
<th>REQUIRED READING/ASSIGNMENT DUE ON THAT DAY</th>
<th>FRIDAY LAB</th>
<th>TUESDAY LAB</th>
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<td>Lab 1. Introduction to EXCEL, Scientific Notation, Logarithms, unit conversion (low impact)</td>
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<td>Ch. 3 – Global Radiation Balance p. 34-40</td>
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<td>B&amp;M ch. 5 – The Age of the Earth Review for midterm 1</td>
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<td>Ch. 4 – The Atmosphere</td>
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LOW IMPACT ASSIGNMENTS

The purpose of low impact assignments is to allow students to perform written assignments without the pressure of grades. It is meant to give you a chance to write an assignment without worrying about too many details such as grammar, etc… In ESS-1 there are two low impact assignments.

Deadline for low impact assignments
Students are expected to email the assignments to Prof. Frei so that he receives it BEFORE the beginning of class on the due date. Late assignments will not be accepted!!!!

Format of your assignments
Everything you hand in should by typed in MS WORD or some equivalent word processing program. You should use 12-point font, single spaced with 1-inch margins.

Low Impact Assignment 1: Chapter 5 from B&M, The Age of the Earth
The first low impact assignment has two parts. For the first part, read the chapter, which is provided to you in a pdf file, and write a 1 to 2 page chapter-summary in your own words. Don’t forget to mention what the main points of the chapter were, and what the conclusions were. This summary is expected to be in your own words.

For the second part of the assignment, choose one of the names from the following list. Do an internet, or library search, on these individuals, and provide a ½ to 1 page summary of the person, including where and when they lived, what their main contributions were to science (some of them will have many), and in particular which contributions were relevant to the subject of the chapter we read. This summary can be taken largely from a source that you found, as long as you provide the reference to the source.

List of names:
James Hutton
Charles Lyell
Stephen Jay Gould
Robert Hooke
Georges Louis Leclerc, comte de Buffon
Alexander von Humboldt
Lord Kelvin (William Thomson)

Low Impact Assignment 2: Chapter 10 from B&M, Continental Drift
Read the chapter, which is provided to you in a pdf file, and write a 1 to 2 page chapter-summary. Don’t forget to mention what the main points of the chapter were, and what the conclusions were. Your summary is expected to be in your own words.