PGEOG 25100- Spring 2017
Earth System Science II
Lecture Instructor: Professor Randye Rutberg
Lab Instructor: Ms. Angelika Winner

CLASS SCHEDULE:
LECTURES: Monday/Thursday, 11:10 – 12:25, Room 1022 Hunter North
LABS: Section 1: Monday, 1:10 – 2:00, Room 1090B Hunter North
Section 2: Thursday, 1:10 – 2:00, Room 1090B Hunter North

PROFESSOR RUTBERG CONTACT INFORMATION:
Office Department of Geography, Room1041 Hunter North
E-mail rrutberg@hunter.cuny.edu (*)
Tel. 212-772-5326
Office Hours: M/Th 2:30-3:30, ***please make an appointment***

Ms. WINNER CONTACT INFORMATION:
Office Geography Department, Room 1032 Hunter North
E-mail angelicawinner@gmail.com (*)
Office Hours: ***by appointment***

* **Note**: the best way to contact us is via email – (1) You must include the course name or number in your subject line. (2) You must include your entire name as it appears in CUNYfirst in your email. We will try to answer all emails within 24 hours. Allow for a 48 hour delay on the weekends.

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice. Updates will be posted regularly on BlackBoard.

REQUIRED TEXT BOOKS
Students must obtain their own copies of:
Kump, Kasting, and Crane, 2010, *The Earth System*, (3rd edition preferred), Pearson/Prentice Hall Publishers. ISBN-10: **0321597796** | ISBN-13: **978-0321597793**
This book has been ordered at the Hunter College bookstore and at Shakespeare and Company

Bryson, Bill, *A Short History of Nearly Everything*, Broadway Books, 2004,
ISBN10: 076790818X

ADDITIONAL READINGS AND LAB MATERIAL will be provided, including lab exercises that have been designed specifically for this course
**this list may be updated prior to course start date

COURSE DESCRIPTION AND OBJECTIVES

This course is the second part of a two-course sequence. Here, we continue the objectives of the PGEOG 25000, and learn about our planet as a system of interacting components, including the atmosphere, the hydrosphere, the lithosphere, and the biosphere. This course, the second one in the sequence, has a greater focus on the biosphere than the first course. The course will consist of three sections: the biosphere, paleoclimate, and the high-latitude climate system: the Arctic and the Antarctic.

The three main objectives of this course are:

1. To further your understanding of "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. The second course of the sequence has a greater focus on the biosphere.

2. To expand your skills in quantitative analysis. In the lab portion of this course we will continue to learn concepts necessary to study environmental systems in a quantitative fashion. Labs are meant to provide you with a number of identifiable skills that can be applied in other courses as well as in work environments. The second course of the sequence will expand on the systems modeling work, and in addition, will focus more on introductory concepts in chemistry and statistics.

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

EXPECTED LEARNING OUTCOMES

1. *Theory*

At the end of the semester, you will be expected to be able to:

- Analyze and interpret the convincing observational data that are used by scientists to study global change;
- Interpret the events in Earth's history that illuminate how the Earth as a system responds to stress;
- Analyze the way the Earth 'works' by studying processes active on Earth's surface; and
- Synthesize how processes function together to determine and regulate Earth's climate, the circulation of the atmosphere and ocean and the recycling of elements

2. *Skills*

At the end of the semester, you will be expected to have acquired basic quantitative skills that will allow them to

- Apply basic mathematical calculations to quantify physical processes under study;
- Visualize data and explain graphs and charts in detail;
- Perform calculations and generate charts using basic computer software such as EXCEL to gain a basic appreciation of modeling environmental systems through the use of the STELLA software; and
- Gather, organize and synthesize scientific literature

COMPUTER LABS
Computer labs will be held once per week in room 1090B-2 Hunter North. Labs will consist of exercises designed to introduce you 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.
NOTE: a greater emphasis will be placed on analysis of data and results.

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

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

PREREQUISITES
Each of you must have passed the first part of this two-course sequence (PGEOG 25000), or have permission of the instructor

GRADES

Homework	15%
Literature Review	10%
Labs	30%
3 exams	45%

Up to an extra 5% for class participation

EXAMS
The exams will be based on the material covered in class, in the textbook and concepts that are learned through the lab portion of the course. The exam dates are CLEARLY posted in the syllabus of the course. The dates are set from day one and cannot be changed. Three exams will be given. See the syllabus for exam dates and information about which chapters will be covered.

About examinations and grades:

a) Grades follow Hunter's grading system: http://catalog.hunter.cuny.edu/content.php?catoid=15&navoid=1433. Grades will be curved at my discretion.
b) Examinations are 1 hour and 15 in length. If you arrive late, you lose that time.
c) Make-up exams are ONLY available in extreme cases, and students must provide documentation of the reason for missing the exam (medical or other forms)
d) I will automatically agree to the CR/NC option ONLY if the conditions stated in the CR/NCR form are satisfied: all course work has been completed and you earned grades such that you accumulate at least 50 points total in the course (this includes labs plus exams plus extra, if you earned any). Students on probation are not eligible for this option. Students

must see me during office hours before the last day of class to discuss this option. Requests for CR/NC as a final grade will not be accepted during or after the final exam.

READING QUESTIONS (LOW IMPACT ASSIGNMENTS)
There are a series of four assigned reading and related questions. For each of the assigned readings, a short written response, essay style, to the questions will be due as indicated in the syllabus. Some class time will be assigned to discussions of the reading. Although these essays are not graded as other work in this course, you do get credit for expressing a coherent response to the articles based on your thoughts about the material described and discussed. A coherent essay shows that you have read and thought about the chapter. The focus is not on polished grammar, but on your thoughts. Group work is NOT allowed for reading questions.

Homework format: All low impact assignments and problem sets must be handed in via email or BB (as specified by the professor). All assignments must be submitted by the beginning of class on the due date specified. A hard copy must be brought to class as well.

When submitting your assignments, the document name must have the following format:

Lastname_firstname_assignmentname_ESS2_2017.doc
Examples:
Rutberg_Randye_HW#1_ESS2017
Rutberg_Randye_HW#2_ESS2017

This naming rubric helps me keep track of student work. If you do not name your documents as specified above, I do not guarantee that they will be graded.

In addition, within the document itself, you must include your full name, assignment title and any other students with whom you worked. All work must be presented in a clear and professional manner. If I cannot read it, I cannot grade it.

Tardiness in handing in assignments and labs:
Lab grades will be penalized for lateness, and reading questions will not be accepted at all. Lecture assignments will not be accepted after the due date. If you feel that you have exceptional circumstances that warrant an extension, you must meet with me during my office hours to discuss your situation.

Classroom policies: You are expected to have read the reading listed for each class day *before class on that date*. There is no texting permitted in the classroom. Laptops (and other tablets) are not necessary and will not be permitted in class. Special considerations will be given in exceptional cases, in which case permission to use laptop has to be obtained from the instructor.

The professor reserves the right to alter or add topics and assignments as needed.

Literature Review Assignment

TARDINESS IN HANDING IN ASSIGNMENTS AND LABS
Late submissions will not be accepted without my prior consent.

Lab grades will be penalized for lateness, and reading questions will not be accepted at all.

Classroom policies: You are expected to have read the reading listed for each class day *before class on that date*. There is no texting permitted in the classroom. Laptops (and other tablets) are not necessary and will not be permitted in class. Special considerations will be given in exceptional cases, in which case permission to use laptop has to be obtained from the instructor. The use of clickers or a Reef polling device is encouraged.

I reserve the right to alter or add topics and assignments as needed.

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. Each unexcused absence after the maximum allowable limit will result in a decrease of 5% from your final grade.

HELPFUL INFORMATION

My Teaching Philosophy: My goal in teaching is to help you become confident and responsible professionals and to make this experience an enjoyable one. My approach to teaching involves being a facilitator in the learning process as opposed to being the authoritarian lecturer at the front of the room with a "one-way information transfer" style. I understand and respect individual differences in learning and do my best to promote learning in the classroom by working with individual differences rather than against them. At the same time, I wish to impart technical skills and a sense of responsibility by encouraging you to play the role of professionals in the classroom.

I expect you to put your best effort in this course. This involves participating in the in-class exercises, reading the assigned material, doing the homework, editing when necessary until they are clear and correct, and preparing for quizzes and exams.

Lecture: I will spend part of the lecture time explaining the key concepts of Earth systems and earth science and discuss, when appropriate, solution of problems. You are expected to devote time outside the classroom to understand the concepts, and review questions given at the end of chapters in the textbook, or questions that I may ask in class. I expect that lectures will give you a clear idea of what is expected in quizzes and exams.

Finally: It is important to start with a good study habit. Consistency is the key. Forming study groups is extremely helpful. Use my time and any resource available to you throughout the semester. Make progress steadily as the material in this course cannot be understood the night before the exam. Concentrate on understanding rather than 'regurgitating'. Put out your best effort every day!

The following are useful tips to do well in this or any class:

- Attend class and take detailed notes.
- Read the assigned material in the text (or other) ***before*** coming to class.

- Re-write your notes as soon as possible after class. This will allow you to fill in the details still fresh in your memory, and prepare questions for the next time the class meets.
- Test yourself by answering the questions in the book and in class.
- Carefully study the diagrams and charts in the book and in the lectures.

As with all courses at Hunter College:

Academic Dishonesty: Please be advised that plagiarism, dishonesty, or cheating in any portion of the work required for this course will be punished to the full extent allowed according to Hunter College regulations.

> **Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.**

See the following report by the Hunter College Senate for more details:
http://www.hunter.cuny.edu/senate/assets/Documents/Hunter%20College%20Policy%20on%20Academic%20Integrity.pdf

ADA Policy
In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, in Room E1214B, to secure necessary academic accommodations. For information and assistance: (212)772-4857 or (212)650-3230.

A Tentative Syllabus is provided below – an updated version will be available at the beginning of the semester from the course website and blackboard (look for file schedule.pdf). Syllabus gets updated throughout the semester, as needed. Check regularly for updates.

TENTATIVE COURSE SCHEDULE
EARTH SYSTEMS SCIENCE I – PGEOG25100 SPRING 2016
Department of Geography, Hunter College

Lecture Instructor: Prof. Randye Rutberg
Lab Instructor: Ms. Angelika Winner, angelikawinner@gmail.com

Tentative Syllabus Readings specified by chapter, with no author (e.g. "Ch. 9: The Biosphere and Biodiversity") refer to the main text of the class (Kump, Kasting, and Crane) which the students are expected to have. Other readings, specified by author, are supplied as pdf files. A complete list of the bibliography will be added shortly. Read Chapter 15 onward, one per week of "A Short History of Nearly Everything".

	Lectures	**Required Reading/Assignment ** Due TODAY ****	**Monday Lab Section 001**	**Thursday Lab Section 002**
1/30	Introduction & Review **PART 1. The Biosphere**: Introduction	Ch. 9: The Biosphere and Biodiversity	**Lab 1**. S-shaped growth: logistic model	
2/2	The Biosphere continued	Finish Chapter 9		**Lab 1**. S-shaped growth: logistic model
2/6	The Biosphere Continued	Finish Chapter 9	**Finish Lab 1 – due today!**	
2/9	Discussion of lab 2	Read Lab 2 guide document and related materials		**Finish Lab 1 – due today!**
2/13	President's Day College Closed			
2/15	Chapter 10, Origin of Earth and Life	Chapter 10, Readings HW1 Due 2/23		**Lab 2**. Stochastic Processes, S-shaped Growth, Forest Succession
2/16	Chapter 10, Origin of Earth and Life	Ch. 10	**Lab 2**. Stochastic Processes, S-shaped Growth, Forest Succession	
2/20	College Closed			
2/23	Chapter 11	Ch. 11 **HW 1 Due**		Lab 2 (cont'd)
2/27	Ch. 11 & Flexible time for reading discussion and review	**QUESTIONS?!**	Lab 2 (cont'd)	
3/2	**Midterm 1. The Biosphere: Ch 9, 10, 11**	Due 3/21		**Lab 3**. biodiversity index
3/6	Chapter 12 Biodiversity through Earth History	Chapter 12, Homework 2 Assigned	**Lab 3**. biodiversity index	
3/9	Chapter 13 Biodiversity through Earth History	Chapter 13		**Lab 4**. Chemistry

3/13	Chapter 13/18, Human Threats to Biodiversity	Ch. 13,18	**Lab 4**. Chemistry	
3/16	Chapter 18, Human Threats to Biodiversity	Ch. 13,18		Lab 4. (cont'd)
3/20	Chapter 15 Global Warming Part 1	Ch. 15 (cont'd) Homework 2, Due today	Lab 4. (cont'd)	
3/23	Chapter 15 Global Warming Part 1	Ch. 15 **Readings E3** Due 3/30		Lab 4. (cont'd)
3/27	Ch 16 Global Warming, Part 2	Ch 16.	Lab 4. (cont'd)	
3/30	Ch 16 Global Warming, Part 2	Ch. 16 (cont'd) **Readings E3** **Due**		**Lab 5.** Climate Data, Statistics, Observations
4/3	Review	Review Chapters 15, 16 prepare questions, Introduce Literature Review	Lab 5. (cont'd)	
4/6	**Midterm 2.** **Paleoclimate: Chap. 15,16 Hansen paper**			Lab 5. (cont'd)
4/10-4/18	Spring Recess			
4/20	Chapter 17, Ozone Ozone Depletion	Chapter 17	Lab 5. (cont'd)	
4/24	Chapter 17, Ozone Ozone Depletion	Ch 17		Lab 5. (cont'd)
4/27	Chapter 18, Pleistocene Glaciations	Ch 18	Lab 5. (cont'd)	
5/1	Pleistocene Glaciations	Ch 18		**Lab 5 due** Lab 6. Data, Statistics, Observations
5/4	Exam III, Chapters 15 and 16		**Lab 5 due** Lab 6. Data, Statistics, Observations	
5/8	Special Topic TBA	Readings TBA		Lab 6. Data, Statistics, Observations
5/11	Special Topic TBA	Readings TBA	Lab 6. Data, Statistics, Observations	
5/15	Special Topic TBA	Readings TBA		**Lab 6 due today**
5/18	Special Topic TBA	Readings TBA Literature Review Due	**Lab 6 due today**	
5/22	**Final Meeting/Project Due 11:30 AM-1:00 PM**			