PGEOG 25100- Spring 2021
Earth System Science II
Lecture Instructor: Professor Randye Rutberg
Lab Instructor: TBA

CLASS SCHEDULE:
LECTURES: Tuesday/Friday 11:10 AM to 12:25 PM
LABS: Tuesday/Friday 1:00 PM to 2:00 PM

PROFESSOR RUTBERG CONTACT INFORMATION:

Office	Virtual via BB Collaborate or Zoom
E-mail	rrutberg@hunter.cuny.edu (*)
Tel.	212-772-5326 (NA for spring 2021)
Office Hours:	Following class and by appointment

LAB INSTRUCTOR CONTACT INFORMATION:

Office	Virtual
E-mail	TBA
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.***

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

REQUIRED TEXTBOOKS
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 four sections: Earth Evolution, Ecology, Climate, and a special topic, the role of the Southern Ocean in the modern carbon cycle and climate.

The four 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.

4. To develop your writing and presentation skills so that you can clearly communicate scientific concepts and processes.

EXPECTED LEARNING OUTCOMES

1. *Theory*

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

- Describe the evolution of the Earth System
- Understand basic ecological processes and ecosystem interactions
- Synthesize how processes function together to determine and regulate Earth's climate.
- Analyze and describe the Southern Ocean's role in regulating atmospheric CO_2.

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 data and literature
- Write/present clearly and concisely to communicate scientific concepts and processes.

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 two weeks. Labs are expected to be emailed to Ms. Winner (or uploaded to BB as per instructions) before the beginning of the next lab.

Be sure to read the lab guidelines found on the Course Information page. This document gives detailed instructions about how labs are to be structured as well as a grading rubric.

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.

Group is also very encouraged for problem sets and class work. However, group work does not mean that each member completes a single problem on their own and then the various problems are combined in a single document. The problem sets are intended to help you learn. Therefore, you all need to understand **all** the problems. Ideally, all group members should complete all the problems and then check their work against one another. Please use the group sign up link on BB so that your homework is automatically graded as a group assignment.

GRADES

Homework:	
Voicethread/writing assignments	15%
Problem sets:	15%
Labs	30%
3 exams	30%
Independent project	10%

Up to an extra 5% for outstanding class participation (contributions to live discussions and/or comments on Voicethreads/Discussion Boards)

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. You must follow the upload instructions. If you do not follow the instructions and your submission is cumbersome to grade, you will receive a zero.

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) Your exams must be written legibly using complete sentences, spelling and proper grammar. If you have a hand writing issue, practice. I cannot grade what I cannot read.
d) 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)
e) 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.

Assignments: Problem set type assignments will be largely based on critical thinking questions at the end of each chapter**.** All assignments must be submitted to Blackboard or Gradescope by the beginning of class on the due date specified. Your assignments must be typed or written very neatly. If I cannot read it, I cannot grade it. Assignments will be graded according to rubrics posted on BB/Gradescope.

When you upload assignments to BB, the document name must have the following format:

Lastname_firstname_assignmentname_ESS2_2021.doc
Examples:
Rutberg_Randye_HW#1_ESS2021
Rutberg_Randye_HW#2_ESS2022

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.

Voicethread Assignments: Voicethread assignments are designed to help you interpret and explain figures, charts and diagrams. These will be two-part assignments. The class has been divided into three groups. Each week, each member of the selected group will be responsible for creating a voice over for one figure/chart/diagram in the posted Voicethread. In addition, students in the selected group must submit a written description of the figure that they have annotated. The companion written description will be turned in via the appropriate link. You must copy and paste the figure you describe into your written submission. The Voicethread voiceover and written description must be completed by Tuesday of a given week. The students who are not in this group are required to leave at least two comments on the Voicethread. These comments can be questions, suggests to improve the presentation, or additional insights into the figure. The comments are all due on Friday.

This may all sound overwhelming but keep in mind each student in the course will be presenting a slide only four times during the semester. In addition, these Voicethreads will serve as a mini-Kahn like academy that can be used as a study aide. Examples and rubrics will be provided to guide your efforts. Please see the Voicethread schedule at the end of the syllabus. In addition, make note of your Voicethread group number.

Independent Project: The independent project will require you to combine skills that you have learned in this class. I will provide a framework for selecting a topic. Students will select a topic, obtain my approval, use a publicly available database to gather data, read 5-10 background papers and then create and present a lightning talk on their project as well as turn in a one-page summary.

Tardiness in handing in assignments and labs:
Lab grades will be penalized for lateness. 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.

Classroom policies: You are expected to have read the reading listed for each class day *before class on that date*. I encourage you to turn your cameras on for class meetings.

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

ATTENDANCE
I will take attendance for the first few classes. I expect you to turn your cameras on so I can link your names to your faces and try to get to know you. I will not take attendance for most sessions as I feel that this will waste a large portion of class time. However, I will record attendance using BB Collaborate. You will enjoy the course and learn more if you attend class regularly. In addition, please turn off your mail, texts and other distractions during class if you want to master the material.

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. You should plan on spending at least 3 (and up to 6) hours each week reading and studying the material. 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.
- Read the rubrics associated with the assignments so that you understand the expectations.

As with all courses at Hunter College:

Hunter College Policy on Academic Integrity
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 the 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.

Hunter College Policy on Sexual Misconduct
In compliance with the CUNY Policy on Sexual Misconduct, Hunter College affirms the prohibition of

any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationship. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

A. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, on contacting the College's Public Safety Office (212-772-4444)
B. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) of Colleen Barry (colleen.barr7@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link: http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf

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 2021
Department of Geography, Hunter College

Lecture Instructor: Prof. Randye Rutberg
Lab Instructor: TBA
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. Read Chapter 13 onward, one per week of "A Short History of Nearly Everything".

Date	Day of Week	Readings	Assignment	Mon. Lab
Jan. 29	Fri	Formation of the elements Chapters 13 and 14 of Bryson	PDF on BB -readings that complement lecture	Lab 1
Feb. 2	Tues	Evolution of reduced carbon reservoir	PDF on BB--readings that complement lecture	
Feb. 5	Fri	Origin of Life on Earth (Ch.10)		Lab 1
Feb. 9	Tues	Origin of Life on Earth (Ch.10)	# 1 assigned	
Feb. 12	**Fri**	**No Classes Scheduled**		
Feb. 16	Tues	Effect of Life on the Atmosphere (Ch.11)		
Feb. 19	Friday	Effect of Life on the Atmosphere (Ch.11)		
Feb. 23	Tuesday	Metabolism, Ecosystems and Biodiversity (Ch. 9)	#1 due	

Feb. 26	**Friday**	**Exam I**		Lab 2
March 2	Tues	Metabolism, Ecosystems and Biodiversity (Ch. 9)		
March 5	Friday	Biodiversity through Earth's History (Ch.8)		Lab 2
March 9	Tues.	Biodiversity through Earth's History (Ch.8)	#2 assigned	
March 12	Friday	Human threats to biodiversity (Ch 18)		Lab 3
Mar. 16	Tuesday	Human threats to biodiversity (Ch 13)		
Mar. 19	Friday	Earth Evolution – Long- term climate regulation (Ch.12)	# 2 due	Lab 3
Mar. 23	Tues	Earth Evolution – Long- term climate regulation (Ch.12)		
Mar. 26	Friday	Pleistocene Glaciations (Ch.14)	# 3 assigned	Lab 4
Mar. 30		**SPRING RECESS- NO CLASSES**		
Apr. 2	Friday	**SPRING RECESS- NO CLASSES**		
Apr. 6	Tuesday	Pleistocene Glaciations (Ch.14)		
Apr. 9	Fri	Global warming Part 1 (Ch. 15)	# 3 due	Lab 4
Apr. 13	Tues	**Exam II**		
Apr. 16	Fri	Global warming Part 1 (Ch. 15)	# 4 assigned	Lab 4
Apr. 20	Tues	Global warming Part 2 (Ch. 15)		
Apr. 23	Friday	Global warming Part 2 (Ch. 15)	# 4 due	Lab 5
April 27	Tues	Climate – flexible time		
April 30	Friday	Southern Ocean Introduction	Supplemental Readings	Lab 5
May 4	Tuesday	Southern Ocean - glacial timescales	Supplemental Readings	
May 7	Friday	Southern Ocean – Last Millenium	Supplemental Readings	Lab 5
May 11	Tuesday	Southern Ocean - Modern	Supplemental Readings	
May 14	Friday	Lightning Talks and course wrap-up	Paper due	Lab 6
May 25	Friday	FINAL EXAM	9-11 AM	

** The Role of the Southern Ocean in the modern Carbon cycle.

Voicethread/Figure write-up schedule

Voicethread posts and companion figure descriptions are due each Tuesday prior to class. Voicethread comments are due each Friday **prior** to class. Late posts and comments will NOT be grades. Group numbers can be found on BB.

Date	**day**		
Feb. 2	Tues	Group 1 posts and figure description submission	
Feb. 5	Fri	All student comments due	
Feb. 9	Tues	Group 2 posts and figure description submission	
Feb. 12	Fri	All student comments due	

Feb. 16	Tues	Group 3 posts and figure description submission	
Feb. 19	Friday	All student comments due	
Feb. 23	Tuesday	Group 1 posts and figure description submission	
Feb. 26	**Friday**	All student comments due	
March 2	Tues	Group 2 posts and figure description submission	
March 5	Friday	All student comments due	
March 9	Tues.	Group 3 posts and figure description submission	
March 12	Friday	All student comments due	
Mar. 16	Tuesday	Group 1 posts and figure description submission	
Mar. 19	Friday	All student comments due	
Mar. 23	Tues	Group 2 posts and figure description submission	
Mar. 26	Friday	All student comments due	
Mar. 30			
Apr. 2	Friday		
Apr. 6	Tuesday	Group 3 posts and figure description submission	
Apr. 9	Fri	All student comments due	
Apr. 13	Tues	Group 1 posts and figure description submission	
Apr. 16	Fri	All student comments due	
Apr. 20	Tues	Group 2 posts and figure description submission	
Apr. 23	Friday	All student comments due	
April 27	Tues	Group 3 posts and figure description submission	
April 30	Friday	All student comments due	
May 4	Tuesday	Group 1 and 2 posts figure from assigned paper (TBA)	
May 7	Friday	All student comments due	

May 11	Tuesday	Group 3 posts and figure from assigned paper (TBA)	
May 14	Friday	All student comments due	