

Spring 2021

PGEOG 38306/PGEOG 70506- Ecology of Global Change

Monday 1:10-4 PM

Class Zoom Link: <https://gc-cuny.zoom.us/j/98473471309?pwd=dGVGcC9rN1JyNjV6em1nMUFKYjZkQT09>

Instructor: Dr. Andrew Reinmann

Office Hours: By appointment via Zoom

Email me to set up a time to meet

Email: areinmann@gc.cuny.edu (Best method of contact)

When emailing, you should **include the course number in the subject heading.**

Every attempt will be made to respond to emails in a timely manner. In general, emails received between 9 a.m. and 5 p.m. on normal workdays will be responded to on the same day, but emails received after 5 p.m. may not receive a response until the following day.

Course Overview

Human activities have introduced a suite of planetary-scale perturbations to the Earth system that have profoundly altered the composition and functioning of ecosystems across the planet. In *Ecology of Global Change*, we will explore the ecological consequences of a wide range of global change phenomena including climate change, land use and land cover change, acid deposition, habitat fragmentation, urbanization, invasive species and environmental pollution. Through a combination of lectures, discussions, reading the primary literature, group activities, and individual field projects you will become familiar with the seminal and cutting-edge research investigating the effects of global change on ecosystems and their biota, the scientists conducting this research and the methods they use. Student evaluation will be based on participation in class discussions, write-ups for readings, group/individual assignments, exams, and a presentation.

Expected Learning Outcomes

1. Understanding of what global change is
2. Basic understanding of ecological processes
3. Basic understanding of biogeochemical cycles
4. Understanding of how and why different aspects of global change have an effect on ecological processes and biogeochemical cycles
5. Perform data analysis and interpret data in spatial and temporal dimensions
6. Understanding of how scientists go about studying and quantifying the impacts of global change on ecosystems
7. Developing the skills to comprehend, critique, and write about scientific research

Prerequisites

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Students must have passed at least one 100-level science course, or have permission from the instructor. **Proficiency in Microsoft Word, Excel, and Powerpoint is assumed.**

As this is an upper-level/graduate-level course, **I expect well-written assignments.**

Communication is an incredibly important component of science, and clear and concise articulation of science will be emphasized in this course. I encourage ALL students to take advantage of the wonderful writing resources available to you at Hunter (<http://www.hunter.cuny.edu/thewritingcenter-ce>) as this will hopefully improve your written communication skills AND your grades on assignments!

Required Texts

There are no required textbooks for this course. Instead, readings will be derived from the peer-reviewed literature, scientifically rigorous internet sources, and articles from the popular media. A list of readings will be posted to BlackBoard 1-2 weeks ahead of time.

Classroom Policies

You are expected to have all assignments submitted to BlackBoard or turned in by the due date/time and to have completed all relevant readings before class on that date. During class, please stay muted unless you are asking a question or otherwise participating in class.

Attendance

Because class discussions are central to achieving the learning outcomes of this course, attendance is critical. Therefore, students are strongly encouraged to attend each class and it is the student's responsibility to figure out what was missed during any absence. I strongly suggest connecting with at least two students, if possible, to connect with in the event you miss a class.

Grades

Grades are based on two quizzes, one final exam, one consumer product presentation, one group research project, participation in class discussions, and write-ups for readings – see questions to be answered in the Appendix of this document (I will randomly ask you to turn these in at the start of class for credit). Additional criteria for graduate students: 1) different exams, 2) lead discussions for 1-2 of the assigned readings during the semester, 3) separate guidelines for the group project, and 4) a presentation in the field at Harvard Forest.

Final Exam	30%
Presentation	15%
Individual Assignments	20%
Group Assignments	20%
Write-ups for readings	10%
Class Participation	5%

Lectures

Class will meet once each week. The format will be part traditional lecture and part discussion of a particular topic and the assigned readings. Once the weather warms up, we might do mini-field trips to Central Park or other locations nearby to further discuss the ecological processes and aspects of global change covered in class.

Exams

The two quizzes will be mostly short answer and will test your knowledge of the material covered during that section of the course. The final exam is comprehensive and will be based on lectures, readings, discussions in class, the field trip to Harvard Forest, and consumer product presentations given by each of you. Exams will begin at the start of class and if you arrive late you will have less time to complete the exam. A missed exam will be graded as a zero and make-up exams will ONLY be available in the case of a documented unavoidable circumstance that results in an excused absence. You are required to notify me if you know ahead of time that you will need to miss an exam for an excused reason.

Consumer Product Presentation

Over the course of the semester you are expected to research the ecological impacts of a consumer product of your choice. However, you need to get prior approval from the instructor. You will present a 7-minute PowerPoint presentation to the class at the end of the semester. In addition, you will need to prepare an abstract (250-word limit) describing the content of your presentation. You will not be given credit for this presentation if the topic did not receive prior approval from the instructor. You will also be required to turn in the slides used for your presentation. Abstracts will be compiled into one document for the first day of presentations. As such, abstracts submitted late will be penalized 50%. The general basis for grading is as follows: Content (50%), Abstract (20%), Overall quality of slides and presentation (30%). The information you include in your presentation must come from at least four peer-reviewed sources (additional references from other reliable sources (check with me) are allowed, but need to be in addition to the four peer-reviewed sources). **NOTE: You will be docked points if your presentation exceeds the time limit, if the format of your references (inserted on the last slide) is incorrect (see required format below), and/or if you do not have the proper number of references.**

Individual Research Projects

During the course of the semester, you will be expected to collect data about your neighborhood on metrics like canopy cover, tree health, land surface temperature, land cover, and ecosystem services provided by street trees. The details will be described in the assignment posted to Blackboard. From this research, you will be required to write a 2,500 paper in the format of a scientific manuscript that includes Introduction, Methods, Results, and Discussion sections. The tools and data sources you will use for this project include QGIS (see below), ClimateEngine.org, The National Land Cover Database (<https://www.mrlc.gov/data>), and iTree Canopy (<https://canopy.itreetools.org/map>).

Group Projects

In groups of ~5, you will conduct a suite of exercises using GIS, remote sensing, and archived data sets to deepen your quantitative understanding of the ecological impacts of environmental change and how scientists study these phenomena. As a group, you will turn in figures based on your analyses and a ~1-2-page description of your methods and results. In addition, each group will be expected to give a brief, informal presentation about their findings. To do the GIS analyses required for many of these projects, you will need to download QGIS (<https://www.qgis.org/en/site/>), which is a freely-available software. While prior experience with GIS will be helpful, it is not necessary as tutorials for each assignment will be posted to Blackboard. The topics of these assignments include:

1. Changing vegetation cover
2. Trees as a driver of local temperature
3. Phenology and climate
4. Forest Fragmentation

Write-ups for Readings:

For each assigned reading from a peer-reviewed source (i.e., not website or popular media readings), I expect you to provide a BRIEF (1-3 sentences) answer to each of the following questions. If hand-written, make sure it is legible. NOTE: I will randomly collect these write-ups throughout the semester, but for weeks when there are multiple readings from peer-reviewed sources, I will only collect the write-up from one (your choice for which one to submit).

1. Who wrote the manuscript and what institution are they affiliated with (if multiple authors, focus on the first author)?
2. What is the problem or question being addressed?
3. Why does it matter?
4. What approach did the authors take to answering their question (e.g., observational vs experimental study, field/lab/modeling/remote sensing-based, review, synthesis, etc.)?
5. What are their main findings and take-home messages?
6. Do you think their conclusions are substantiated by the data they present and literature they cite?

General Note on Assignments:

It is your responsibility to submit assignments on time, even if you miss class. Late assignments will be penalized as follows: <1 day = -10%; 1-2 days = 20%; 2-3 days = 30%; >3 days = 50%. **In rare circumstances, I will allow assignments to be submitted late without penalty, but you must speak to me ahead of time.**

Required citation format:

Within text:

Smith et al. (2017) indicate that ozone pollution reduces plant growth.

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Ozone pollution has been shown to reduce plant growth (Smith et al. 2017) and impair ecosystem function (Smith and Jones 2016).

In the works cited section:

Author last name, initials. Year. Paper Title. Full Journal Name Vol:page numbers.
e.g., Smith A.S., Jones, R.B., and LeRoy, S. 2017. Ozone pollution impairs tree growth. *Global Change Biology* 23:121-133.

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (i.e., grading) statement, this syllabus is a guide for the course and is subject to change with advance notice. Any changes to the syllabus will be posted to Blackboard and the instructor will bring changes to the students' attention in class.

Incomplete Policy

I do not give Incomplete (INC) as a final course grade except under extreme and documented circumstances. In order to receive an INC you must be doing passing work at the time of the final exam. Undergraduate students must notify me within 48 hours of the scheduled final exam and also make arrangements with me to complete a Contract to Resolve an Incomplete Grade in which we will establish a deadline for completing missed work and/or examinations. This contract must be completed **prior to final grade submissions**. Graduate students must request the INC within 48 hours of the scheduled final exam. In either case if I do not hear from you within the specified time period I will average your grades and record them.

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.

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-

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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.barry@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>

Hunter College 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 education 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, located in Room E1214B, to secure necessary accommodations. For further information and assistance, please call: (212) 772-4857 or (212) 650-3230.

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Tentative Schedule for Spring 2021
(NOTE: Refer to reading list each week for required readings)

Lect. #	Date	Assignment	Topic
1	Feb 1		Course Overview; Overview of Ecology Global Change, and the Anthropocene
2	Feb 8		'How to Read a Scientific Paper'; Barriers to inclusion in science
3	Feb 15		Biogeochemical Cycles & C and N Cycles; Introduction to iTree
4	Feb 15		NO CLASS: President's Day
5	Feb 22		Air Pollution & Atmospheric Deposition
6	Mar 1		Land Cover Change: Deforestation & Habitat Fragmentation
7	Mar 8		Land Cover Change: Deforestation & Habitat Fragmentation
8	Mar 15		Land Cover Change: Urbanization
9	Mar 22		Land Cover Change: Urbanization
10	Mar 29		NO CLASS
11	April 5		Climate Change
12	Apr 12		Climate Change
13	Apr 19		Climate Change
14	Apr 26		Invasive Species
15	May 3	Cons. Prod. Abstracts Due by 9 a.m.	Student Consumer Products Presentations
16	May 10		Student Consumer Products Presentations
17	May 17		Where do we go from here?
18	May 24		FINAL

Red font = No Class; Blue font = Assignment or Quiz;