EESC UN3114: Climate Impacts on Humans in NYC
TR 2:40pm-3:55pm, 558 EXT Schermerhorn Hall, Zoom link

Instructor Information

Nathan Lenssen
PhD Student, Department of Earth and Environmental Sciences
n.lenssen@columbia.edu

Office Hours: Monday 4-6, Wednesday 3-5,
559 EXT Schermerhorn Hall

Course Description

How has climate shaped the history and development of NYC? How do climate and climate change affect our lives today? How will climate change affect our lives tomorrow?

Variations in climate and weather have been major sources of risk and opportunity for humanity long before the industrial revolution began warming the planet. The growing impacts of climate change on human civilization over recent decades have turned attention from the future of our climate to the present. In this course, we investigate how the climate system intersects and interacts with the complex human system of NYC.

The trajectory of this course will be set by the drafting of a final paper and presentation which will be done in small pieces throughout the semester. The first few weeks of the course will include lectures, activities, and assignments that will guide the selection of a specific climate impact for NYC and the formation of a **research question** for your final paper and presentation. This initial research question will then guide the majority of your assignments for the rest of the semester. Using this question, the five major sections of a scientific paper structure the schedule for the remainder of the course: Introduction, Data, Methods, Results, and Conclusions.

By the end of this course you will be able to...

1. Write a paper synthesizing climate and socioeconomic data to quantify the impacts of climate change on humans in NYC.
2. Define and distinguish between climate variability and climate change and determine the contributions of natural climate variability and climate change to increased risk of a climate impact.
3. Use model and observational climate data to quantify and understand changes in the climate system that have occurred in the past and may occur in the future.
4. Determine and quantify the risk of exposure to climate impacts for various populations of humans in NYC while accounting for the inherent uncertainty in projections of natural and human systems.

In addition to these objectives, you will gain the following **transferrable skills** that will serve your development as a general researcher and critical thinker**.** You will learn...

1. How to conduct statistical analyses and create figures in excel and/or python.
2. Methods for conducting a scientific literature review and reading scientific papers.
3. Resources and methods to find, download, and process climate data so that it can be used in a research project.
4. How to write the five sections of a scientific paper.
5. How to give and receive feedback from your peers.

Prerequisites

This course requires EESC2100 The Climate System. It will build upon the climate science learned in the course as well as the data analysis and technical writing skills developed in the lab. No additional knowledge or coursework is assumed.

Forms of Assessment

Assessment in this course is focused around the final paper. The majority of in-class and take-home assignments will be focused on developing your paper. The goal of this style is to write a high-quality paper with a constant, but moderate workload throughout the semester (instead of concentrating the workload right before due dates). Using the sections of your paper as an application of the science we are learning in class will lighten your workload and ensure consistent progress on the paper. Following the course schedule will set you up well for a gentle end of the semester incorporating suggested edits on your draft sections into a final paper and presentation. However, it will require engagement from the beginning of the course, particularly in the selection of your project topic.

25% Final paper

- Due on the date of our final exam (May 12th, 2022)
- 15% for final draft (Sunday, April 24th, 2022)
    - See rubric for final paper at end of syllabus
- 10% is for editing in response to comments/revisions
    - Will do a re-grade based off of the syllabus

10% Final communication of findings through a Zine

25% Introduction Section Final Draft

- A polished, near-final form of the introduction section will be due around the midpoint of the semester and will be graded as a final product (not as a draft)
- The timing of this assessment is to ensure that you have done sufficient background research to create a research topic and question to answer using data in the second half of the class.
- As the instructor, I will provide through feedback so that the section can be revised and modified for use as the introduction in the final paper.

10% (each) The 3 other paper section drafts and associated homework assignments

- Section drafts will be due approx. one week after each unit
- The vast majority of points on a draft section will be following the scaffolding provided in the form of in-class and out-of-class assignments
- Extensions on the draft will only be granted for illness and accommodations discussed at the beginning of the course as I don't want people falling behind!

10% Participation

- A 'catch-all' category for attendance of, preparation for, and participation in our class sessions.
- See expanded section on participation below

Class Participation Policy

Attendance and engagement during class sessions is essential to this course. There will be many activities that require working in small groups and discussing or presenting material to the class. I realize that this is not everybody's favorite thing, so we will spend some time during the first few classes discussing a participation policy that everybody feels comfortable with. I want everybody to feel comfortable sharing the things they understand and, more importantly, the things that confuse them.

We will also work as a class to determine the rubric for the class participation grade. My rough idea is that you will get 100% if you show up to every class, have completed the assigned reading, and are usually engaged with the lesson. However, I want to make sure that I am setting reasonable and relevant expectations.

Office Hours

Meeting with me once during office hours to discuss your potential project ideas is an assignment to be completed within the first 2 weeks of the course. While my office is at Lamont and I will be commuting there many days, I am on Morningside campus every Tuesday and Thursday and can often meet with you on campus on other days, particularly if early in the morning or late in the afternoon/evening.

Attendance in office hours after the initial meeting is encouraged. It is an informal setting to work with your peers and the TAs on any questions you may have about the course material or your assignments. If you email your question ahead of time, I can be more prepared to answer when you stump me. On the other end, and equally welcome, you can show up to office hours with zero preparation and just chat about what we have been learning, your summer job search, or the crazy storm that just passed through!

Email Policy

In addition to our office hours, I encourage questions over email. I find myself that attempting to write an email outlining my question allows me to answer my own question at least half of the time. I will do my best to answer emails within 24 hours and will certainly answer within 48 hours. If you haven't heard anything after 48 hours, please just send the same email again.

Materials

All readings will be provided on courseworks or as downloads through the Columbia Library resources at clio.columbia.edu

Columbia Statement on Disability Accommodation

Students, instructors, and Disability Services (DS) all have rights and responsibilities in the process of ensuring that students receive the reasonable accommodations necessary for their full participation in their academic program. This page provides a brief oversight of these rights and responsibilities, but for more information you are referred to Disability Services.

If you are a student with a disability and have an DS-certified 'Accommodation Letter' please come to my office hours to confirm your accommodation needs. If you believe that you might have a disability that requires accommodation, you should contact Disability Services at 212-854-2388 and disability@columbia.edu

Columbia Statement on Academic Integrity

The intellectual venture in which we are all engaged requires of faculty and students alike the highest level of personal and academic integrity. As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity.

Scholarship, by its very nature, is an iterative process, with ideas and insights building one upon the other. Collaborative scholarship requires the study of other scholars' work, the free discussion of such work, and the explicit acknowledgement of those ideas in any work that inform our own. This exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited.

In practical terms, this means that, as students, you must be responsible for the full citations of others' ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent.

Any breach of this intellectual responsibility is a breach of faith with the rest of our academic community. It undermines our shared intellectual culture, and it cannot be tolerated. Students failing to meet these responsibilities should anticipate being asked to leave Columbia.

Late work policy

Late work without a documented excuse for the final introduction section, final presentation, and final paper will not be accepted. Late work without excuse for other assignments will have a 15% penalty per day. The late policy is set to be strict as most of the deadlines are set to ensure sufficient progress on the final paper. As many of the assignments are drafts, it is almost always better to turn in a partially complete draft than to turn in something late.

Semester at a Glance (Assuming 14 weeks, 2 meetings/week)

Dates	**Week**	**Topic(s)**	**Assignment Due Dates**
J20	**1**	Course Introduction	
J25/27	**2**	Intro to climate impacts	
F1/3	**3**	Understanding climate literature	**3.1:** Have 1-1 meeting with me by this date **3.2:** Preliminary literature review
F8/10	**4**	Heat extremes and sea level rise	**4.2:** Formal topic proposal
F15/17	**5**	Climate variability and peer review	**5.2:** Introduction outline
F22/24	**6**	Intro to data and socioeconomic data	**6.2: Final introduction section**
M1/3	**7**	Climate observations and models	**7.2:** 1 paragraph data proposal
M8/10	**8**	Introduction to statistical methods	**8.2:** Draft of data section
M22/24	**9**	Statistics applied to climate impacts	**9.2:** HW on applied linear regression
M29/31	**10**	Limitations of regression/Figures	**10.1:** One paragraph method proposal
A5/7	**11**	Prediction of future climate impacts	**11.1:** Draft of methods section
A12/14	**12**	Drawing conclusions from statistics	**12.2:** Draft of results section
A19/21	**13**	Extra topics/careers in climate	
A26/28	**14**	Project presentations	**Final Presentation**
TBD	**Final**	No written final	**Final paper**

Introduction Rubric

Concerns *Areas that Need Improvement*	**Criteria** *Standards for Performance*	**Advanced** *Evidence of Meeting or Exceeding Standards*
	Research Question The report poses a well-defined research question related to a specific climate impact on NYC	
	Writing The writing is clear and concise. The goal of the study is clear from the text of the paper	
	References At least three papers from academic journals are referenced in the introduction as motivation and context for the study.	
	Peer-Review Provides constructive comments to two of your peers on their introduction sections. Addresses the major comments raised in the review of your own introduction	

Grades:

A 1 category exceeds standards, all others meet standards
A- All categories meet standards
B+ 3 categories meet standards
B 2 categories meet standards
B- 1 category meets standards
C Minimum grade for an introduction that has been turned in that contains a research question

Final Paper Rubric

Concerns *Areas that Need Improvement*	**Criteria** *Standards for Performance*	**Advanced** *Evidence of Meeting or Exceeding Standards*
	Research Question The report poses a well-defined research question related to a specific climate impact on NYC	
	Climate Data The analysis uses appropriate observational and model data and discusses the limitations of the chosen data	
	Climate Variability The analysis uses the methods discussed in class to quantify the climate variability and change relevant to the research question	
	Climate Impact The analysis determines how climate is relevant to the research question and uses climate data to quantify how climate has impacted humans in the past OR how climate will impact humans in the future	
	Figures The paper contains at least 3 student-created figures. They contain a representation of the uncertainty or variability in the quantity plotted. They are fully self-describing with necessary captions, labels, legends, and titles.	
	Writing The writing is clear and concise. The analysis conducted is reproducible from the text of the paper.	
	References At least three papers from academic journals are referenced in the introduction as motivation and context for the study	

Final Paper Grades:

A 2 category exceeds standards, all others meet standards
A- All categories meet standards
B+ 5 categories meet standards
B 3 categories meet standards
B- 1 category meets standards
C Minimum grade for an paper that has been turned in that contains all 5 sections

Final Presentation Rubric

Concerns *Areas that Need Improvement*	**Criteria** *Standards for Performance*	**Advanced** *Evidence of Meeting or Exceeding Standards*
	Effective Communication Not too fast, not too slow with rate of speech and rate of slides	
	Organization A road map of the presentation is given and followed. The motivation and research question is given at the beginning and a conclusion at the end summarizes how the findings answer the research question.	
	Use of Graphics and Figures Figures have appropriate text size for readability, are labeled properly, and are explained clearly	
	Responses to Questions Provides thoughtful answers to any questions asked. You demonstrate that you understood the question, relate the question to your presentation, and give a response drawing on your research and the materials learned in class.	
	Timing The presentation is between 8-10 minutes.	