SCI 12600: Principles of Environmental Science

Instructor:
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Office Hours: Thursday: 2:30-3:30pm and by appointment

Course description:
This course explores core topics in the environmental sciences with an emphasis on depth of understanding of the subject matter and an awareness of the skills and methods used in the environmental sciences to better understand the interrelationships of the natural world. Subject matter is drawn from a variety of disciplines, including biology, chemistry, and earth science, and focuses on analyzing environmental problems both natural and human-made, and proposing alternative solutions to these problems. Class format is a combination of interactive discussions, hands-on activities, and participation in an extended research project.

Class schedule:
Tuesdays and Thursdays 10:00-11:40am in NAC 5/215. Because of the participatory nature of the class, attendance is mandatory. You are allowed one absence or three late arrivals (5 minutes late) with no questions asked. Beyond that, I reserve the right to lower your semester grade, if appropriate.

Books and Handouts:
GLOBE Program Teacher's Guide and Elementary GLOBE storybooks (www.globe.gov), selected readings and movies (which will be posted on Blackboard). You are expected to keep a complete and organized record of your environmental analyses and/or data in your science notebook.

Blackboard:
All students must use CUNY electronic blackboard. It is assumed that you will check blackboard for all assignments and announcements. Blackboard includes a feature that automatically sends announcements via email, so please check your CCNY email too.

Course outcomes:
Upon completion of this course, students will understand the big ideas of environmental science including interactions between systems, patterns of change, and measurement and uncertainty. Students will study the carbon cycle, water cycle, and nitrogen cycle and learn how they interact in the atmosphere, pedosphere, hydrosphere, and biosphere. Students will investigate Earth systems, and will deepen their understanding of Earth due to the interactions of these systems. Students will learn how to follow GLOBE protocols to collect atmosphere, soil, and hydrology data, and will organize and represent this data in tables and graphs. Students will also access data sets on the Internet to pose questions or obtain further data to support and test their explanations regarding environmental issues. Students will be able to design and implement research focusing on the collection and analysis of information and data related to the environment of NYC.

Exams: There will be a midterm and a final exam in this course.

Reading Assignments: Students are expected to complete all assigned reading in the GLOBE Teacher's Guide, Elementary GLOBE Storybooks, and supplementary articles. Students are expected to be prepared to actively participate in class discussions, referencing the readings to support their statements. Being present in class is a necessary prerequisite for being an active participant in class.

Attendance: Because of the participatory nature of the class, timely attendance is mandatory. "Getting notes from a friend" will not replicate the learning experience of a missed session. You are allowed one absence or three late arrivals (5 minutes late) with no questions asked. Beyond that, I reserve the right to lower your semester grade. Three late marks will count as an absence. If you miss, for whatever reason, more than six sessions, you will be withdrawn from the course. The expectation is that you will be present, on time**,** and prepared for every class. Please contact me if you will not be present in class due to an emergency or other special circumstances. Consult the CCNY academic calendar when planning vacations or travel.

Course grade:
Your final grade for the course will be based on the following:

Environmental Issue Part 0 & A-D: Drop lowest	20%	Participation	15%
Env. Issue Part E	10%	Midterm	20%
Final Presentation: Env. Issue Part F	10%	Final	25%

Successful completion of ALL of these is required in order to pass the course.

Policy on Academic Integrity:
Under the CUNY Student Academic Integrity Policy - "Academic Dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion, as provided herein." Violations of this policy fall into these areas that include but are not limited to:

- Cheating
- Obtaining Unfair Advantage
- Falsifying of Records and Official Documents
- Plagiarizing

Here are more details on plagiarism from the CUNY academic integrity policy:
Plagiarism is the act of presenting another person's ideas, research or writings as your own.
The following are some examples of plagiarism, but by no means is it an exhaustive list:
• Copying another person's actual words without the use of quotation marks and footnotes attributing the words to their source.
• Presenting another person's ideas or theories in your own words without acknowledging the source.
• Using information that is not common knowledge without acknowledging the source.
• Failing to acknowledge collaborators on homework and laboratory assignments.

Internet plagiarism includes submitting downloaded term papers or parts of term papers, paraphrasing or copying information from the internet without citing the source, and "cutting & pasting" from various sources without proper attribution.

I welcome any questions you may have concerning academic integrity and will do my best to help you understand the standards of academic scholarship. CUNY guidelines are used to sanction any incidents of academic dishonesty in courses. Any student who violates this policy will FAIL the course.

ENVIRONMENTAL ISSUE PROJECT: Throughout the semester, you will work individually to complete a final project. The last assignment in the project is to partner with a person that shares your topic to create a presentation.

Pat 0 and Parts A-E: Each of these assignments is worth 5% of your grade, except Assignment E, which is worth 10% of your grade. Lowest homework grade will be dropped (except assignment E).

TIMELINE:

Part 0 (due Feb 11): For three topics of your choice, read articles provided (on Blackboard). For each topic, come to class ready to discuss the following:

- Why did you choose this topic?
- What did you learn from the articles?
- How does this topic relate to environmental processes?
- Were there connections that you made between the three articles you read about each topic?

Please turn in your notes from each article and make sure you answer each question.

Part A (due Feb 20): Submit a paper to answer the following prompts for your final project:

- Write at least one paragraph summarizing the issue you are addressing in your final project.
- How is your topic connected to the environmental spheres we are studying: Atmosphere, Pedosphere, Hydrosphere, and Biosphere?
- How do things that we do contribute or improve this issue?

Part B (due Mar 5): Submit a 1-3 paragraph paper, revisiting the connection between your topic and the Atmosphere in a more detailed way

Part C (due March 19): Submit a 1-3 paragraph paper, revisiting the connection between your topic and the Pedosphere in a more detailed way

Part D (due March 26): Submit a 1-3 paragraph paper, revisiting the connection between your topic and the Hydrosphere in a more detailed way

Part E (due Apr 21): Submit a 2-3 page double spaced paper to connect your topic to the atmosphere, pedosphere, hydrosphere and biosphere. This should be a cohesive essay in which each paragraph connects to the next. The essay should center on a central thesis. Use active verbs. Do not repeat yourself. (10%)

Part F (due via email by 11:59pm, night of May 6): Final Presentation, one submission per partner group.

Final Presentation Should Include:

1. Title
2. An overview of your topic. Define it. (5%)
3. How topic connects to the:
    a. Hydrosphere (10%)
    b. Pedosphere (10%)

c. Atmosphere (10%)
d. Biosphere (10%)

Make connections in the order that that makes the most sense for your topic.

4. What's being done to address your issue?
    a. Is there any local action surrounding this issue? Focus on local action in the New York area. If this issue is more relevant to another location, focus on that location. (15%)
    b. What steps are being taken to counteract this issue, either politically, or that have actually been implemented, or both? (10%)
    c. Are there proposed actions that are not being implemented, but have the potential to address this issue? (10%)

Presentation Length:

1. Presentations should be 8-10 minutes long with a few minutes for questions. All students need to record questions during presentations and be prepared to ask them.

Presentation Appearance:

1. Use images
2. Outline form
3. Few words
4. Large and easily visible font

Presentation Skills: Did you share the responsibility of speaking? Were you practiced?

Presentation length, appearance, skills: Total 20%

Possible Environmental Issue Project Topics (no more than 2 students per topic)**:**

1. Gowanus & Newtown Creek Superfund
2. Fast Fashion
3. Cell phones and computers: E-waste recycling & mining for cell phone component parts
4. Microplastics
5. Pesticides and their effect on wildlife
6. Impacts of Corn Agriculture
7. CAFO: Industrial animal farms; Chicken, pig, cattle
8. Aquaculture: Salmon, Shrimp, Mussels
9. Aquaculture Mussels
10. Combined Sewage Overflows, Raingardens, Bioswales
11. Hydropower: Dams and fish spawning
12. Mountain top removal coal mines
13. Hydrofracking
14. Offshore drilling
15. Tar Sands Oil Production & Pipelines
16. Comparative carbon footprints around the globe
17. Sustainable/green buildings
18. Urban resiliency in response to projected sea level rise

Tentative SCHEDULE (dates subject to change)

	Tuesday	*Thursday*
Jan 28 Jan 30	Connecting the atmosphere (A), pedosphere (P), hydrosphere (H), and biosphere (B) Carbon in our lives: Carbon in the atmosphere, pedosphere, hydrosphere, biosphere A, P, H, B	Carbon Footprint Tragedy of the Commons Environmental Issue Assignment Discussion A, P, H, B
Feb 4 Feb 6	Greenhouse Effect Measuring Temperature Data Use of scientific instruments; Calibration; Protocols (thermometer – calibration) A	Water Cycle: Water in the atmosphere, pedosphere, hydrosphere, biosphere Heat pollution: Urban heat island/ air temp/surface temp/water temp **Due: Bring completed calibration protocols** A, P, H, B
Feb 11 Feb 13	Atmosphere: Other air pollutants: Intro to aerosols experimental design **Due: Articles Related to Topics Aerosols Storybook** A	Satellite imagery data and compare different parts of Earth A,B
Feb 18 Feb 20	Satellite imagery data and compare different parts of Earth A, B	Creating own visualization Connecting to satellite data A, B **Due: Final Project Assignment A**
Feb 25 Feb 27	Atmosphere: Aerosols: Data Analysis A	Atmosphere: Cloud Cover Classification; Cloud Fraction **Due: Sky Observations & GLOBE Cloud Story Book** A
Mar 3 Mar 5	Atmosphere: Cloud Cover Classification; Cloud Fraction **Due: GLOBE Observer App Downloaded & Sign in with GLOBE account** A	Nitrogen Cycle: Nitrogen in the atmosphere, pedosphere, hydrosphere, biosphere Review **Due: Final Project Assignment B** A, P, H, B
Mar 10 Mar 12	**MIDTERM**	Pedosphere: Soil as Water Filter: Just passing through **Due: Soil Elementary GLOBE storybook** P, H

Mar 17 Mar 19	Online Class: NYC Water Story **Due: GLOBE water story book** **Due: Final Project Assignment C** H	Pedosphere: Soil Composition Pedosphere: Compost **Due: Bring in a NYC soil sample** P
Mar 24 Mar 26	Bulk Density; Soil moisture P	Finish up Bulk Density/Soil moisture **Due: Final Project Assignment D** P
Mar 31 April 2	Connecting Atmosphere, Pedosphere, Hydrosphere, Biosphere Garbage & waste we produce and what happens to garbage (Plastic trash runoff) A, P, H, B	Hydrosphere water detectives; pH conductivity H
April 7 April 9	*No Class – Wednesday Schedule*	*No Class – Spring Break*
April 14 April 16	*No Class- Spring Break*	*No Class- Spring Break*
April 21 April 23	Hydrosphere: Alkalinity, Salinity **Due: Final Project Assignment E** H	Hydrosphere: Dissolved oxygen H
April 28 April 30	Go to Hudson Share data; Ask Questions; Analyze Data H	Hydrosphere: HRECOS GLOBE Datasets H
May 5 May 7	Connecting to biosphere, atmosphere, pedosphere & biosphere through the carbon cycle, water cycle & nitrogen cycle A, P, H, B	Presentations **Due: Final Project Assignment F** (5/6 at 11:59pm via email)
May 12 May 14	Presentations	Presentation Discussion Review
May 19	**Final Exam**	