

International Pollution Issues

Spring 2023

Tuesdays/Fridays, 10:00 AM to 11:15 am – HN 1022

Undergraduate GEOG 33500-01

Graduate GEOG 71500-01

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Office Hours: Tuesdays, 11:30am – 12:30pm

Course Description:

This course explores the international trans-boundary pollution and contamination. The continuous technological advances such as transportation or genetic manipulation, the globalization of industrial processes, the rise of emergent countries known as B.R.I.C.S., and the massive human migrations around the world have made pollutants and contaminants can be transmitted through the borders in an unprecedented scale. From the COVID-19 Virus to Chinese mercury found in the Olympic-Mountain lakes through stagnant plastics in the Pacific Ocean, any pollutant and contaminant can reach any point in a planetary scale. We examine therefore the main international trans-boundary pollution sources with especial emphasis in the main industrial and urban centers, transport pathways such as oil/gas pipelines, maritime-shipping and aerial routes, and contamination events such as oil spills or nuclear-power plant accidents that impact beyond a country's borders. Finally, this course will discuss the current national and international legal instruments of cooperation such as the London Treaty about ocean dump or possible future international treaties such as a definite international Climate Change Pact to counteract degradation of the environment.

Modus Operandi for the Class:

The class will be “**in-person**.” However, in case of an emergency, we may switch to “hybrid” mode (using Zoom).

Required Materials:

There will be no textbook. The course will include assigned materials that are available through articles, texts, chapters, films, and audios. These materials are available in the section “Course Materials” on Blackboard. Where indicated on the syllabus, materials will be found online.

Schedule of Topics and Assignments*

*Except for changes that substantially affect implementation of the evaluation statement, this syllabus is a guide for the course and is subject to revision by the instructor. Any changes will be announced in advance.

Course Objectives:

This course has been designed to...

1. Introduce students to global implications of anthropogenic activities that lead to production of critical substances (e. g. smog) resulting in detrimental changes to our environment and encourage the students to think critically about human's responsibility towards a sustainable future.
2. Study the actions taken by the international community and by international organizations to find appropriate ways for conciliating divergent interests of the major industrialized countries and the developing world.
3. Understand what science is, how the scientific method works, and explore possibilities of connections with the Traditional Knowledge and Wisdom (TK&W)
4. Learn to write coherently, grammatically, and critically through diverse assignments such as a Proposal and a Final Research Paper.
5. Access, evaluate, interpret, and cite scientific information from peer-reviewed journal articles and other relevant sources.

Student Learning Outcomes:

Upon completion of this course, students will be able to...

1. Acquire broad knowledge of the Earth environment, using a systems approach to identify and describe its history, components, their functions and interactions at multiple spatial and temporal scales.
2. Comprehend the most prevalent environmental impacts caused by our civilization and think about those possible measures capable of promoting a more sustainable society environmentally speaking.
3. Gather, measure, synthesize and evaluate data from diverse sources using visual, analytical and statistical approaches to describe and interpret relationships, trends and make predictions about future changes.
4. Communicate effectively in the language of the discipline, incorporating written, oral and visual methods. Students will communicate to audiences ranging from scientific to policy oriented. Students will be prepared to become active, informed citizens ready to have an impact on society.
5. Build knowledge about the environmental dimensions of systemic racism and other types of oppression such as those based on gender or religious identity. Students will be able to recognize and explain the diverse human experiences of injustice including environmental racism and apply environmental knowledge and skills to advance social justice and sustainability.
6. Your attainment of these learning outcomes will be assessed especially through your writing assignments, exams, scientific projects (e. g. Group work), and class participation.

Course Assignments. This course will be based upon:

<u>ASSIGNMENTS</u> <u>Undergraduates</u>	<u>% for the</u> <u>Final Grade</u>	<u>CHARACTERISTICS/</u> <u>REQUIREMENTS</u>
Proposal (Group Report)	10%	Around 3 pages and at least 3 References
GROUP PROJECT Report	35%	-Around 25 pages; 5 references -Exposition of a case of pollution in the NYC area
Literature Review Document	15%	5 References
Specific Study Research Case	10%	-2 pages; double Space) -At least 3 References -See potential questions in Appendix 1
Mid-Term and Final Exams	20%	Multiple Choice Questions
PRESENTATIONS	5%	~ 10 minutes (e. g. using PowerPoint)
<u>(Class Participation)</u>	5%	
PARTICIPATION 2: <i>EcoCredits Report/s</i>	Extra-Credit	- <u>At least 1 Extra-Class Activities</u> is required -More than 1 is extra-credit See more details in Appendix 1

<u>ASSIGNMENTS</u> <u>Graduates</u>	<u>% for the</u> <u>Final Grade</u>	<u>CHARACTERISTICS/</u> <u>REQUIREMENTS</u>
Abstract	5%	250 word
Proposal (Group Project Report)	10%	4-5 pages and at least 5 References
GROUP PROJECT Report	30%	-Around 40 pages; 10 references -Exposition of a case of pollution in the NYC area
Literature Review Document	15%	10 References
Specific Study Research Case	10%	-3 pages; double Space) -At least 5 References -See potential questions in Appendix 1
Mid-Term and Final Exams	20%	Multiple Choice Questions
PRESENTATIONS	5%	~ 15-20 minutes (e. g. using PowerPoint)
<u>(Class Participation)</u>	5%	
PARTICIPATION 2: <i>EcoCredits Report/s</i>	Extra-Credit	- <u>At least 1 Extra-Class Activities</u> is required -More than 1 is extra-credit See more details in Appendix 1

Final letter grades will be assigned based on the CUNY grading policy that can be found in the online undergraduate catalog available at: <http://catalog.hunter.cuny.edu/>.

Key points about these assignments:

1. You will receive feedback for the Proposal, Final Paper, Sustainability Project, and Poster (Science Exploratory Project).
2. You will have the opportunity to re-write the Proposal of Final Research Paper.
3. A complete description of the assignments is located in Appendix 1 at the end of the Syllabus.
4. You can find the due dates for all of the assignments in the Course Content and Calendar section of the syllabus (see below).

Course Contents and Calendar:

Part I: Course Introduction

Week 1: January 27th (Friday):

Topic: Introduction, Science/Traditional Knowledge, and Pollution

1. Introduction to the Course and Description of the Syllabus
2. What is Pollution? And Transboundary Pollution?
3. Pollution and Environmental Justice
4. Proposal of the Group Report Project (Phase 1):
 - Forming Groups
 - Selecting a Research Topic

Required Materials:

- Environmental Encyclopedia (2003). "Transboundary Pollution." Available at <https://www.encyclopedia.com/environment/encyclopedias-almanacs-transcripts-and-maps/transboundary-pollution>
- European Environmental Agency (2018). "Pollution." Available at <https://www.eea.europa.eu/archived/archived-content-water-topic/wise-help-centre/glossary-definitions/pollution>
- Milman, Oliver (2018). "Robert Bullard: 'Environmental Justice isn't just slang, it's real.'" *The Guardian* (December 20). Available on <https://www.theguardian.com/commentisfree/2018/dec/20/robert-bullard-interview-environmental-justice-civil-rights-movement>

PART II: Atmosphere and Pollution

Week 2:

January 31st (Tuesday):

Topic: General View of the Atmosphere and Its Pollution

1. Structure and Composition
2. Atmospheric Pressure Systems, Air Masses, and the Atmospheric Circulation
3. General View of the Atmospheric Pollution: from Smog to Wildfires
4. Proposal (Phase 2):
 - Research Questions
 - Literature Review 1

Required Materials:

- Bergman, Edward F. and Rennwick, William H. Chapter 2: “Weather and Climate” (pages 45-66) in *Introduction to Geography: Peoples, Places, and Environment*
- McKnight, Tom L. Chapter 3: “Introduction to the Atmosphere” (pages 59-65) in *Physical Geography*

February 3rd (Friday):

Topic: Atmospheric Pollution 1

1. Smog: Smoke + Fog: Donora, London, New York, and Beijing
2. Acid Deposition (rain and snow)
3. The Ozone Layer and Its Depletion
4. Proposal (Phase 3): Literature Review 2

Required Materials:

- Dahlman, Carl T. and Renwick, William H. (2014). Chapter 5, “Earth’s Resources and Environmental Protection” (read pages 187-191) in *Introduction to Geography*
- Met Office (2018). “The Great Smog of 1952.” Available at <https://www.metoffice.gov.uk/learning/learn-about-the-weather/weather-phenomena/case-studies/great-smog>
- The New York Times* (2018). “In a High-Stakes Environmental Whodunit, Many Clues Point to China.” Available at <https://www.nytimes.com/2018/06/24/world/asia/china-ozone-cfc.html>
- Schlanger, Zoe (2017). “The Story of the 27 Sudden Deaths in 1948 is a Bleak Reminder of Why America Needs Clear Air Laws.” *Quartz* (Nov. 1st). Available at <https://qz.com/1117029/the-sudden-death-of-26-people-in-a-tiny-american-town-on-halloween-weekend-shows-the-bleak-reality-of-life-before-clean-air-laws/>
- US Environmental Protection Agency (EPA) (n. d.). “Basic Ozone Layer Science.” Available on <https://www.epa.gov/ozone-layer-protection/basic-ozone-layer-science>

Week 3:

February 7th (Tuesday):

Topic: Atmosphere and Pollution 2:

1. Wildfires
2. Volcanic Eruptions
3. Aerosols
4. Proposal (Phase 4): Methodology (Data collection) and Materials

Required Materials:

- Casazza, Marco; Lega, Massimo; Liu, Gengyuan; Ulgiati, Sergio; and Endreny, Theodore (2018). “Aerosol pollution, including eroded soils, intensifies cloud growth, precipitation, and soil erosion: A review.” *Journal of Cleaner Production*, Volume 189, 10 July 2018, Pages 135-144.
- Chapter 16, “Wild Fires” pages (488-492)

- Gislason, S. R. et al. (2015). “Environmental Pressure from the 2014-15 Eruption of Barbanbunga Volcano, Iceland.” *Geochemical Perspective Letters*. Available at http://www.geochemicalperspectivesletters.org/documents/GPL1509_noSI.pdf
- Hirschlag, Allison (2020). “The Long Distance Harm done by Wildfires” (*BBC*, 23rd August). Available at <https://www.bbc.com/future/article/20200821-how-wildfire-pollution-may-be-harming-your-health>

PART III: Hydrosphere and Pollution

February 10th (Friday):

Topic: The Hydrosphere and Its Pollution:

1. The Water Cycle and its Dynamics
2. Planetary Water Distribution: from the Oceans to the Cryosphere
3. General View of the Pollution in the Hydrosphere
4. [Proposal \(Phase 4\): Intellectual Contribution](#)

Required Materials:

- McKnight, Tom L. (1996). Chapter 9, “The Hydrosphere” in *Physical Geography* (5th edition)

Week 4:

February 14th (Tuesday):

Topic: Oceans and Pollution 1:

1. Plastics/Microplastics in the Ocean
2. Sargassum and Algae Invasion
3. The Law of the Sea (UNCLOS) and International Dumping
4. [Proposal \(phase 5\): Review and Discussion of the Final Draft](#)

Required Materials:

- Browne, Mark Anthony, Crump, Phillip, Niven, Stewart, Teuten, Emma, Tonkin, Andrew, Galloway, Tamara, and Thompson, Richard (2011). “Accumulation of Microplastic on Shorelines Worldwide: Sources and Sinks.” *Environmental Science & Technology* DOI: 10.1021/es201811s
- Hu, Chuanmin, Brock Murch, Brian B. Barnes, Mengqiu Wang, Jean-Philippe Maréchal, James Franks, Donald Johnson, Brian Lapointe, Deborah S. Goodwin, Jeffrey M. Schell, and Amy N. S. Siuda (2016). “Sargassum watch warns of incoming seaweed.” *Earth and Space Science news (Eos)* (Sept. 6)
- International Union for Conservation of Nature (IUCN) (n. d.). “Marine Plastic Pollution.” Available on <https://www.iucn.org/resources/issues-briefs/marine-plastic-pollution#:~:text=At%20least%2014%20million%20tons,causes%20severe%20injuries%20and%20death>.
- United Nations (n. d.). “Oceans and the Law of the Ocean.” Available on <https://www.un.org/en/global-issues/oceans-and-the-law-of-the-sea>

February 17th (Friday):

Topic: Oceans and Pollution 2:

-Assignment: PROPOSAL of the Group Report

1. The New Arctic Exploitation and Pollution
2. Oil Spills

-Case: The Greenpoint Oil Spill

3. Group Report (phase 1): Identification of the Problem/s

Required Materials:

- Kaushik, Mohit (2018). “Major Oil Spills of the Maritime World.” *Marine Environment* (March 26). Available at <https://www.marineinsight.com/author/mohitk/>
- National Geographic (2016). “In the Arctic’s Cold Rush, There Are No Easy Profits.” Available at <https://www.nationalgeographic.com/magazine/2016/03/new-arctic-thawing-rapidlycircle-work-oil/>
- Reuters (2018). “Oil Spilled at Sea.” Available at <http://fingfx.thomsonreuters.com/gfx/rngs/OIL-SPILLS/010060SL1GQ/index.html>

Further Materials:

- Chang, Stephanie E. et al. (2014). “Consequences of oil spills: a review and framework for informing planning.” *Ecology and Society* 19 (2): 26. <http://dx.doi.org/10.5751/ES-06406-190226>. Available at <https://www.ecologyandsociety.org/vol19/iss2/art26/>

Week 5:

February 21st (Tuesday):

NO CLASS; Classes follow a Monday schedule

February 24th (Friday):

Topic: Oceans and Pollution 3:

1. Submarine Mining
2. Acidification
3. Coral Bleaching
4. Group Report (phase 3): Consequences or Main Pollution Impacts

Required Materials:

- Fabry, Victoria J., Seibel, Brad A., Feely, Richard A., and Orr, James C. (2008). “Impacts of Ocean Acidification on Marine Fauna and Ecosystem Processes.” *ICES Journal of marine Science*, Volume 65, Issue 3, 1 April 2008, Pages 414 – 432 <https://doi.org/10.1093/icesjms/fsn048>
- Hughes, Terry P. et al. (2018). “Global warming transforms coral reef assemblages.” *Nature*, Volume 556, pages: 492-496
- The International Union for Conservation of Nature (IUCN)* (2018). “Deep-Sea Mining.” Available at <https://www.iucn.org/resources/issues-briefs/deep-sea-mining>

Week 6:

February 28th (Tuesday):

Topic: Rivers and Lakes Pollution 1

1. Transboundary Watersheds
2. Convention on the Law of the Non-Navigational Uses of International Watercourses

(1997)

3. Water Transfers

4. General View of Riparian/Limnological Pollution

5. [Research Paper \(phase 4\): Results 1](#)

Required Materials:

- Kaiman, Jonathan (2014). “China’s Water Diversion Project starts to flow to Beijing.” The Guardian (Dec. 12). Available at <https://www.theguardian.com/world/2014/dec/12/china-water-diversion-project-beijing-displaced-farmers>
- United Nations (1997). “Convention on the Law of the Non-Navigational Uses of International Watercourses. UN International Law Commission. Available at http://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf
- U.S. EPA (2015). “What is a Watershed?” Available at <http://water.epa.gov/type/watersheds/whatis.cfm>
- Water-technology.wet (2015). “GMR (Great Man-Made River) Water Supply Project, Libya.” Available at <http://www.water-technology.net/projects/gmr/>

March 3rd (Friday):

Topic: Rivers and Lakes Pollution 2

1. Transboundary Conflicts

2. Transboundary River Pollution

Cases: a. The Colorado River

b. The Tijuana River

3. The Aral Sea Disaster

4. [Group Work \(phase 5\): Results 2](#)

Required Materials:

- Columbia University (2008). “Aral Sea Crisis.” Available at <http://www.columbia.edu/~tmt2120/introduction.htm>
- Gerald, Andrea K. (2015). “Resistance and Reform: Transboundary Water Governance in the Colorado River Delta.” *Review of Policy Research*
- Phys.org (2016). “Managing an endangered river across the US-Mexico border” (July 18th)
- Tory, Sarah (2018). “Two countries, one border and their shared pollution.” *High Country News* (Dec. 8). Available at <https://www.hcn.org/articles/pollution-two-countries-one-border-and-their-shared-pollution>

Part IV: Energy Sources and Pollution

Week 7:

March 7th (Tuesday):

Topic: Nuclear Energy and Pollution 1

1. What is Nuclear Energy?

2. Fission and Fusion

3. Nuclear landscape: uranium mining/enriching, reactor, and deposit

4. [Group Report \(phase 6\): Discussion 1](#)

Required Materials

- Reisser, Wesley and Reisser, Colin (2019). Chapter 6, “Nuclear Power” in *Energy Resources: From Science to Society*
- “Nuclear Reactor - Understanding how it works” (video). Available at <https://www.youtube.com/watch?v=1U6Nzcv9Vws>

March 10th (Friday):

Topic: Nuclear Energy and Pollution 2

1. Radioactivity
2. Nuclear Residual Materials
3. Ocean Dumping Events and Transportation
 - Case: Post-Fukushima
4. Nuclear Reactor/Facility Accidents
 - Case: Chernobyl

Required Materials:

- Calmet, Dominique P. (1989). “Ocean Disposal of radioactive Waste: Status Report.” Available at <https://www.iaea.org/sites/default/files/31404684750.pdf>
- Lallanilla, March (2013). “Chernobyl: Facts About the Nuclear Disaster.” *Livescience* (Sept. 25). Available at <http://www.livescience.com/39961-chernobyl.html>
- McKenzie, Pete (2022). “In the Pacific, Outcry Over Japan’s Plan to Release Fukushima Wastewater” *The New York Times* (December).
- Reisser, Wesley and Reisser, Colin (2019). Chapter 6, “Nuclear Power” in *Energy Resources: From Science to Society*
- U.S. Department of Energy (2016). “Waste Isolation Pilot Plant Overview.” [Video]. Available at <https://www.youtube.com/watch?v=kZYQIXd1lkk>

March 12th (Sunday):

-Assignment: Specific Study Research Case

Week 8:

March 14th (Tuesday):

Topic: Coal and Pollution 1

1. Coal Basics: Formation, Types, Coal landscape
2. General view of Coal Pollution

Required materials:

- Reisser, Wesley and Reisser, Colin (2019). Chapter 3, “Coal” in *Energy Resources: From Science to Society*

March 17th (Friday):

Topic: Coal and Pollution 2

1. Coal and Pollution

2. Coal, Ukraine's War, and Germany's Position
3. Coal Mining Fire and Pollution: Centralia (US)

Required Materials:

- Berks, Howard (2018). "An Epidemic Is Killing Thousands Of Coal Miners. Regulators Could Have Stopped It." *NPR* (December 18) (also audio). Available at <https://www.npr.org/2018/12/18/675253856/an-epidemic-is-killing-thousands-of-coal-miners-regulators-could-have-stopped-it>
- Krajick, Kevin (2005). "Fire in the Hole." *Smithsonian Magazine* (May). Available at <https://www.smithsonianmag.com/science-nature/fire-in-the-hole-77895126/>
- Scientific American* (2017, Jun. 7). "The Other Reason to Shift away from Coal: Air Pollution That Kills Thousands Every Year." Available at <https://www.scientificamerican.com/article/the-other-reason-to-shift-away-from-coal-air-pollution-that-kills-thousands-every-year/>
- The New York Times* (Oct. 22, 2022). "Germany's New Hunger for Coal Dooms a Tiny Village."

Week 9:

March 21st (Tuesday):

-Assignment: MID-TERM Exam

March 24th (Friday):

NO CLASS

Group Report (phase 7): Updates: Each group will have to use the class' time to continue with the investigation of the report (you can meet in class or virtually). Each group will report me some updates by email.

Week 10:

March 28th (Tuesday):

Topic: Petroleum/Natural Gas and Pollution:

1. Petroleum Basics: Formation, Types, and Petroleum Landscape
2. Pollution Issues of:
 - a. Hydraulic Fracturing (Fracking)
 - b. Ukraine's War, Europe and Natural Gas

Required Materials:

- BBC* (2022). "Nord Stream: Sweden finds new leak in Russian gas pipeline." Available at <https://www.bbc.com/news/world-europe-63071552>
- Meng, Qingmin (2017). "The impacts of fracking on the environment: A total environmental study paradigm." *Science of the Total Environment* 580: 953–957
- Reisser, Wesley and Reisser, Colin (2019). Chapters 4, "Oil" in *Energy Resources: From Science to Society*
- University of Michigan Engineering (2012). "The Impact of fracking." [Video]. Available at

<https://www.youtube.com/watch?v=YAg18qTt0tc>

- U.S. Environmental Protection Agency (EPA) (2015). “Assessments of the Potential Impacts of the Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. Executive Summary (June). Available on EPA: “Fracking has no broad impact on drinking water” (US Today June 2015) at <http://www.usatoday.com/story/news/2015/06/04/fracking-epa-drinking-water/28510779/>

March 31st (Friday):

Topic: Biosphere, Planetary Cycles and Ecosystems

1. The Biosphere and Its Planetary Cycles
2. Ecosystems and Biomes
3. General View of the Biospheric Pollution

Required Materials:

- Chapter 10, “Cycles and Patterns in the Biosphere”
- Chapter 11, “Terrestrial Flora and Fauna” in Physical Geography by Tom L. McKnight

Week 11:

April 4th (Tuesday):

-Assignment: Literature Review Document

Topic: Ecosystems, Genetics, Invasive Species, and Pandemics

1. Genetic Modified Organisms (GMOs)
2. Invasive Species
3. Pandemics: From Antonine Plague to COVID-19

Required Materials:

- DiBacco, Claudio et al. (2012). “Ballast water transport of non-indigenous zooplankton to Canadian ports.” *ICES Journal of Marine Science*, 69(3), 483-491. doi:10.1093/icesjms/fsr133
- Gallegos, Jenna (2017). “GMO salmon caught in U.S. regulatory net, but Canadians have eaten 5 tons.” *The Washington Post* (August 4). Available at https://www.washingtonpost.com/news/speaking-of-science/wp/2017/08/04/gmo-salmon-caught-in-u-s-regulatory-net-but-canadians-have-eaten-5-tons/?utm_term=.1695ac7c0ebc
- Lallanilla, Marc (2019). “What Are GMOs and GM Foods?” *Live Science*. Available at <https://www.livescience.com/40895-gmo-facts.html>
- LePan, Nicholas (2020). “Visualizing the History of Pandemics.” Available at <https://www.visualcapitalist.com/history-of-pandemics-deadliest/>
- The National Wildlife Federation (2019). “Invasive Species.” Available at <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-to-Wildlife/Invasive-Species>

Further Materials:

- Democracy Now* (2010, Sept. 17). “Percy Schmeiser vs Monsanto: The Story of a Canadian Farmer's Fight to Defend the Rights of Farmers and the Future of Seeds.” Available at https://www.democracynow.org/2010/9/17/percy_schmeiser_vs_monsanto_the_story

April 7th (Friday):
NO CLASS; SPRING RECESS

Week 12:
April 11th (Tuesday):
NO CLASS; SPRING RECESS

April 14th (Friday):

Topic: Planes, Ships and Their Pollution

1. Airplane Traffic
2. Shipping Transportation
3. Group Report (phase 6): Solutions or Mitigation Measurements

Required Materials:

- Clear Seas (2018). "Air Pollution and Marine Shipping." Available at <https://clearseas.org/en/air-pollution/>
- IATA (2013). "Airlines Expect 31% Rise in Passenger Demand by 2017." Available at <http://www.iata.org/pressroom/pr/pages/2013-12-10-01.aspx>
- International Maritimer Organization (IMO) (2020). "Prevention of Air Pollution from Ships." Available at <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx>
- Inman, Mason (2010). "Plane Exhaust Kills More People Than Plane Crashes." *National Geographic* (October 10). Available at <http://news.nationalgeographic.com/news/2010/10/101005-planes-pollution-deaths-science-environment/>
- Mann, Adam (2010). "Space tourism to accelerate climate change." *Nature* (October 22) Available at <http://www.nature.com/news/2010/101022/full/news.2010.558.html>
- Vidal, John (2009). "Health risks of shipping pollution have been 'underestimated'." *The Guardian* (Thursday 9 April). Available at <http://www.theguardian.com/environment/2009/apr/09/shipping-pollution>

Week 13:
April 18th (Tuesday):

Topic: Garbage and Pollution

1. Garbage and Its Main Treatments: Landfills, Incineration, and Recycling
2. Basics of Garbage and Its Pollution
3. The Freshkills Landfill Project/Park: A Model?

Required Materials:

- Burford, Melanie and Moyer, Greg (2014). "Living City | Where Does Our Trash Go?" *The New York Times* (Sep. 25th, 2014) (Video). Available at <http://www.nytimes.com/video/nyregion/100000003131953/where-does-our-trash-go.html>
- Chapter 12: "Waste Disposal" in *Geohazards: Natural and Human* by Nicholas K. Coch
- The Freshkills Alliance (n.d.). "Freshkills Park." Available at <http://freshkillspark.org/>

April 21st (Friday):

-Assignment: Group Report

Topic: Trans-Border Garbage

1. Trans-Border Garbage and the Basel Convention (1989)
2. Landfills and Poor Communities and Sweden Importing Trash for Electricity
3. Ship Breakers: Bangladesh

Required Materials:

- Clark, Liat (2012). "Sweden to import 800,000 tonnes of trash to burn for energy." Available at <http://www.wired.co.uk/article/sweden-imports-garbage-for-energy>
- Gwin, Peter (2014). The Ship-Breakers. *National Geographic* (May). Available at <https://www.nationalgeographic.com/magazine/2014/05/The-Ship-Breakers/>
- Milman, Olive (2019). "We're not a dump' – poor Alabama towns struggle under the stench of toxic landfills." *The Guardian* (April 15). Available on <https://www.theguardian.com/us-news/2019/apr/15/were-not-a-dump-poor-alabama-towns-struggle-under-the-stench-of-toxic-landfills>
- United Nations (2020). "Basel Convention: Overview." Available at <http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx#>

Week 14:

April 25th (Tuesday):

-Assignment: last day to hand EcoCredits

Topic: From Plastic to Virtual Garbage

1. Plastic, Recycling and Third World Countries
2. E-Waste
3. Cloud garbage: Virus, Spams, and Trojans
4. Space: satellite junk and the Nemo Point's garbage

Required Materials:

- Greenpeace (2009). "Where does e-waste end up?" Available at <http://www.greenpeace.org/international/en/campaigns/detox/electronics/the-e-waste-problem/where-does-e-waste-end-up/>
- McVeigh, Karen (2018). "Huge rise in US plastic waste shipments to poor countries following China ban." *The Guardian* (Oct. 5). Available at <https://www.theguardian.com/globaldevelopment/2018/oct/05/huge-rise-us-plastic-waste-shipments-to-poor-countries-chinaban-thailand-malaysia-vietnam>
- Moser, Dave (2017). "A Spacecraft Graveyard Exists in the Middle of the Ocean-here's what's down there." *Business Insider* (Oct. 22). Available at <https://www.businessinsider.com/spacecraft-cemetery-point-nemo-googlemaps-2017-10>
- Scientific American* (2001, Oct. 19). "When did the term 'computer virus' arise?" Available at <https://www.scientificamerican.com/article/when-did-the-term-compute/>

Part VII: Understanding the Current Ecological Crisis

April 28th (Friday)

Topic: Climate Change and Pollution

1. Sea Level Rise Impact in:
 - a. Coastal landfills
 - b. Nuclear residual sites
 - c. Salinization
2. Living Relics: Permafrost and Microorganisms

Required Materials:

- Brand, James et al. (2017). "Potential pollution risks of historic landfills on low-lying coasts and estuaries." Available at <https://onlinelibrary.wiley.com/doi/full/10.1002/wat2.1264>
- Chen, Joyce and Mueller, Valerie (2018). "Climate change is making soils saltier, forcing many farmers to find new livelihoods." *The Conversation* (November 29). Available at <http://theconversation.com/climate-change-is-making-soils-saltier-forcing-many-farmersto-find-new-livelihoods-106048>
- Edwards, Rob (2005). "Rising sea levels may destroy nuclear dump." *New Scientist* (June 28). Available at <https://www.newscientist.com/article/dn7591-rising-sea-levels-may-destroy-nuclear-dump/>
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Week 15:

May 2nd (Tuesday)

Presentation and Exhibition of the EcoCredits Report Project/s

May 5th (Friday)

Presentations 1 (Group Report)

Week 16:

May 9th (Tuesday):

Presentations 2 (Group Report)

May 12th (Friday):

NO CLASS; Reading Day

Week 17:
May 16th (LAST CLASS DAY)

Assignment: Final Ecological Meditations and Discussion of the Group Reports

Week 18:
May 22nd (Monday 9:00 - 11:00 am):

-Assignments: FINAL EXAM

Course Policies:

Attendance:

I will take attendance at every class meeting. You should arrive in class on time and stay for the entire session. If you will miss class for any reason, you should discuss this with me ahead of time. You are responsible for any material you may miss. You are allowed five hours of absence, not five days. A low attendance could determine the distinction between an “F” or “WU” grade. Finally, the tardiness generates constant interruptions of the class. The continuous tardiness could generate a reduction of points for the final grade. **DO NOT BE LATE IN CLASS.**

Incompletes:

I do not give incompletes (IN) except under the most extraordinary and documented medical emergencies. No late assignments will be accepted. Without a valid medical excuse, you will receive a grade of zero (0) on any assignment missed. If, for a valid medical emergency, you do miss an assignment, you must contact me within 48 hours of the missed assignment and present acceptable documentary evidence for your absence. At the time of the request, you must also complete a Contract to Resolve an Incomplete Grade in consultation with me. We will agree on what needs to be completed and when it will be due and, if you meet the mutually agreed upon conditions, your course grade will be recomputed and a new grade, if appropriate, will be submitted. I will allow only one semester in which you can resolve the IN/FIN. After that time no request will be considered. The contract form is available in the Department of Geography office, HN 1006, during normal business hours or in OneStop on the 2nd floor of the North Building.

To receive a CR/NC you must have completed all course requirements and have requested the CR/NC option no later than the last scheduled lecture. That means all written assignments, quizzes, exams (including the final exam) must have been completed. If you choose this option, then all grades above 70% will be assigned CR and 69.9% and below will be assigned NC unless you choose the assign D option for grades between 60 and 69.9. Finally, CR/CN is only available to undergraduate students. More information is available at <http://www.hunter.cuny.edu/advising/how-to/file-credit-no-credit-cr-nc>

Classroom Electronics Use:

I permit the use of laptops and tablets **ONLY** for the purpose of taking notes during lecture and discussion. All other personal electronics should be turned off or set to silent before entering the classroom. Absolutely no texting is allowed during class. Any use of electronics beyond their permitted use is a disruption to the class and will be treated accordingly.

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 CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures. 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. Being in college requires discipline, collegiality, and overall honesty. Although knowledge is an accumulation of ideas from different people and epochs that you can use, you have to do so under certain conditions. If you are going to use another's ideas you have to identify their names and works. If you don't, it is called 'plagiarism,' and that is illegal. Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations of the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors.

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, located in Room E1124, to secure necessary academic accommodations. For further information and assistance, please call: (212-772-4857)TTY or (212-650-3230).

Students requiring special consideration during the exams must make arrangements with the Office of Accessibility and tell your instructor of the arrangements.

Hunter College Policy on Sexual Misconduct:

"In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms 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 relationships. 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, or 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) or 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>

Personal Identity:

"All people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed...I will do my best to address and refer to all students accordingly and support classmates in doing so as well."

Appendix 1: A Detailed Description of the Assignments

Description of Scaffolding Process of High-Stakes Assignments

All high-stakes assignments are scaffolded in the following manner. These scaffolding processes are indicated also in the Course Content and Calendar section (see below):

-The Final Research Paper and Proposal:

The completion of this project will be implemented through various steps and revisions:

* **First step:** The students begin to select a list of potential research topics (e. g. nuclear energy pollution or oil spills) for the final project.

* **Second step:** Choosing a final research topic.

* **Third step:** Construction of research question/s connected to the topic and how to collect scientific data.

* **Forth step:** Elaboration of the first draft of the Proposal

* **Fifth step:** Feedback and revision of the proposal.

These first five steps are implemented through commentaries posted by email as well as in brief conversations in class, as indicated in the section Course Content and Calendar.

* **Sixth step:** First draft of the final paper. All students who wish to have revisions of their final research paper should meet with the instructor (email or Zoom) to see where and how the final paper could be improved.

* **Seventh step:** Presentation of the Final Research Paper.

1. Proposal of the Group Report:

It is a document where the student (or researcher) exposes the principal topic of the investigation, what type of research questions she/he will use to explore the topic, the main objectives of the investigation, what methods will be managed to collect data, and the significance of the investigation. The paper proposal is a type of reference that the teacher (or reader) uses to evaluate a priori the plan proposed by the student, and decide any type of necessary change. Any proposal should mainly have the following parts:

Structure of the Proposal:

1. Introduction
2. Literature Review
3. Research Questions and Objectives
4. Methodology and Materials
5. Intellectual Contribution
6. Conclusion
7. Bibliography

1. Introduction: section of the proposal that illustrates the principal theme of the investigation through a short background of the topic. For instance, “Since the 1990s renewable energy projects have become visible features of our landscapes. Countries such as Denmark, Germany or Spain have regions possess an extraordinary density of renewable projects in their territories.”

2. Literature review: part of the proposal where the student demonstrates her/his knowledge about some of the main scholars' works and arguments analyzing this topic. Examples: "Whereas Peter Smith and Lucas Felman (2014) have analyzed the impact of the new wind farm projects in Europe, Leonardo Sanprocio and his research team (2013) have analyzed the environmental consequences of solar and wind projects in the Southwest of United States."

3. Research questions and objectives: section that exposes the main research objectives and question/s used by the student to investigate the topic. For example, "I will explore in this work those environmental impacts caused by wind farm facilities in North Dakota, putting especial attention on the visual integration of wind turbines in the landscape. To study this relation, I will try to answer the following questions: what type of sociopolitical and environmental impacts do renewable energy project generate? How have local communities accepted this type of energy plants?"

4. Methodology and Materials: the student displays in this section all of those methods that will be managed for data collection. These methods can be classified in two categories:

- a. Primary sources: information obtained directly by the student: experiments, interviews, direct observation, etc.
- b. Secondary sources: articles, books, websites, films, or audios.

5. Intellectual contribution: In this section the student demonstrates the importance or significance of her/his work. For instance, "This work is crucial because it will contribute to the understanding of those environmental and cultural impacts caused by the renewable projects."

6. Conclusion: Summary of the paper proposal.

7. Bibliography, Works Cited, or References section

Citation Styles: A completed description of the different citation styles can be found at The University of Pittsburgh (2020). "Citation Styles: APA, MLA, Chicago, Turabian, IEEE: Home" Available on <https://pitt.libguides.com/citationhelp>

3. Abstract (for Graduates):

Section that described shortly, precisely, and efficiently the main components of a paper: background of the topic, research focus, thesis, and methods. Most of the abstracts have around 250 words and are composed by three sections:

-Title

-Main Text

-Key words: between three and four words that reflect precisely the main key points of the investigation.

You can find some guidelines in this link <https://writingcenter.gmu.edu/guides/writing-anabstract>.

A Sample of an Abstract for the American Association of Geographers Conference (AAG):

“Climate Change Denial and the Tragedy of North America's Dams”

With approximately 90,000 big dams, the United States has more dams than nearly any other country. It is commonly recognized that these dams, largely built between the 1930s and the 1960s, are in a state of disrepair; in fact, 80 percent of U.S. dams will reach their life span by 2020. This condition is exasperated by unprecedented changes in climatic patterns. Climate change is accelerating dam vulnerability and boosting the risk of collapse. In California, the Oroville dam, the tallest dam in the United States, nearly collapsed due to the unusual amount of winter precipitation in 2017. In Puerto Rico, the Guajataca Dam, hit hard by hurricane Maria, also nearly collapsed in 2018. And in March 14, 2019, the Spencer Dam did collapse, making it the first dam ever to be destroyed by ice chunks. Despite the undeniable influence of the weather, some entities still reject climate change as a factor threatening dam infrastructure, asserting that the managerial negligence of public institutions and the aging status of dams are the only causes of this decay. This paper exposes how two main ideologies have contributed to the current rejection of climate as a factor in dams' vulnerability. First, the engineering profession still produces engineers who are taught to observe nature mechanically, without recognizing the changing ecological scenario. Second, some conservative agencies, in an effort to convince the public that public institutions and infrastructures do not and cannot function, erase climatic influence from their descriptions.

Keywords: Dams, climate change, engineering, and conservatism

4. Group Work (Report): We will divide the class in various groups. Each group will choose a particular case of environmental/technological pollution in the area of New York City. Some possible examples could be: sea level rising and water pollution in the Long Island area or the Greenpoint oil spill. Each group will present their work in class. An ideal situation would be to select a particular area (e. g. a neighborhood) and collect data (primary and secondary sources) from that area. For example, the collection of garbage amount and type, noise, water pollution, or even plastic pollution from a coastal area (e. g. Jamaica Bay).

F. Structure of the Report:

- Introduction (Topic Background)
- Studied Community
- Identification of the main Problem (air pollution in the Spanish Harlem)
- Consequences
- Results
- Discussion: Possible Solutions
- Methodology

-Intellectual Significance:How could this science project contribute/enrich your artistic expertise and career and also that particular community?

-Bibliography

Elaborate a Report of at least between ~25 pages (40 pages for Graduates) and present it in class.

Finally, you may consider to organize a tour to your specific study area (extra-credit). If so, you could pick up a day (maybe a Saturday) to do this tour.

Various examples from the last semester:

Group 4:

Description: We will be examining air pollution trends around New York City. More specifically, we will collect air pollution data near highways, power stations, airports, and control locations (not near highways, power stations, and airports). The purpose of this project is to compare levels of air pollution in these areas to see where the highest concentration of polluted air might be. We will compare these areas to places further away to compare air quality. We will collect data using websites such as https://a816-dohbesp.nyc.gov/IndicatorPublic/Subtopic.aspx?theme_code=1%2C4&subtopic_id=122. Potential air pollution indicators we can use include PM 2.5, ozone, NO, NO3, and SO3 (all of which are included within the website). We will create maps and bar graphs with our findings for easier visualization. We will be focusing on the geographic location of these hotspots. Using this data, we want to see where the most air pollution is concentrated. We also want to look at areas of research that might be needed when concerning urban air pollution.

Group 6:

Description: Our group is interested in focusing on air pollution in New York City. Christopher St PATH Station is widely reported as the most polluted, in terms of air quality, transit station in NYC. Test Air Quality: comparing the station air quality to street level, a “green” part of the city, such as Central Park, and some of the other transit stations we encounter regularly. We can also ask passersby for their thoughts on the air quality in the station/the city. Causes: what causes the poor air quality in the station. Are these pollutants manageable? Repercussions: What are the health effects of long-term exposure? Which group suffers the most?

5. Literature Review Document:

Note: The students will receive feedback for the proposal, the Group Report, the Literature Review document, the Specific Question Study Case, and the abstract (just for the graduate students) . They will have possibilities to re-write some of the reviews for the proposal.

6. The Specific Question Study Case:

You should answer and reason **one** of the following questions. Your answer should have at least 2 pages (500 words) and 3 references (graduates 3 pages 5 references).

1. Identify the main pollution (air, noise, etc.) at the Hunter College campus. What are the main causes? And how could we reduce this pollution?
2. How could Hunter college reduce its carbon foot print? What solutions could you design?
3. Greenpoint and the Williamsburgh areas have one of the worst air pollution rates in NYC. Identify the main causes and what type of solutions could be generated?
4. The Japanese government has claimed that Japan will be realizing millions of nuclear-wasted water from the Fukushima accident to the Pacific Ocean? What consequences could be created? What type of solutions?
5. Keystone Pipeline experienced an oil spill on December 2022. What have the main consequences have been? What type of mitigation strategies could be taken?

7. Two Exams: Mid-Term and Final Exams:

These exam will be completed in class. The exams will be composed of a set of multiple-choice questions. These questions will be divided in two categories:

1. The question has “just” one correct answer
2. The choice could be either “All of them” or “None of them”

Sample of a Multiple-Choice question:

1. Choose the correct answer about the Earth’s shape:
 - a. The Earth is a sphere with flattened poles
 - b. The Earth is a perfect sphere
 - c. It is a flat planet moving around the sun
 - d. The Earth is not planet, but a moon

8. Oral Presentation of the Final Research Paper and Group Work:

You can use programs such as PowerPoint or others to present your research paper

-Undergraduate students: around 10-15 minutes

-Graduate students: around 15-20 minutes

9. Participation: Class Participation and EcoCredits

This course has two types of participation: indoor and outdoor participation.

a. Class Participation (Indoor):

Class participation is fundamental for your success in this class and includes all of the following: class discussion, Blackboard posts, group activities, data-collection quizzes, data collection excursions, and attendance. You need to study the “Materials” every week (check each class in the syllabus) in order to prepare the class.

b. *EcoCredits*: Outdoor Participation: Extra-Credit

Our course in collaboration with the Greenbelt Society, and institutions such as NYC Parks and the 1-Billion Oyster Project will be organizing diverse outdoor activities such as coastal clean-ups during this semester. Every activity represents a number of credits called *EcoCredits*. The bigger the number of outdoor activities, the bigger the amount of *EcoCredits* or extra-credit will be. Students will have to report each of the activity. How? Just a brief description of what you did, where, when, and how (see below the the Report sample). The objective of these activities is not just learn about environmental issues, but also contribute to mitigate and restore sensitive ecological areas as well as elaborate solutions for those particular scenarios. The students will become not only direct observers, but also active participants in the resolution of ecological issues. Some examples could be,

1. Coastal Clean-Ups:
2. Ecological Restoration of coastal areas, marshes and rivers: planting coastal-marsh species such as *Spartina* or removing of invasive species.
3. Clean-ups and maintenance of green infrastructure such as bioswales.
4. You may consider activities organized by yourself or collaborating with other institutions.

Various examples,

- a. How to expand or start your food-waste for compost in your home.
- b. How to reduce the amount of energy in your home
- c. Or just participating in clean-ups by yourself.

See a Sample below

Sample of a *Eco-Credit* REPORT

Name:	
Last Name:	
Type of Zone:	(e. g. urban, rural, suburb, marsh, etc.)
Location of the Activity:	(e. g. neighborhood, county, state)
Area/Surface of the site:	(e. g. 400 sq. feet)
Date/Time	
Type of Activity	(e. g. coastal clean-up, coastal restoration, bioswales cleaning, etc)
General Description of the Activity	If you participated in a costal clean-up activity, include data/information about the institution that organized this operation, what you did, how much plastic you collected. You could include photos or maps. ~1 page