International Pollution Issues

Spring 2022

Tuesdays/Fridays, 9:45 AM to 11:00 PM – HN 1022

Undergraduate GEOG 33500-01

Graduate GEOG 71500-01

Instructor: Enrique Lanz Oca
Office: Virtual
E-mail: enriquelanzoca@gmail.com
Office Hours: Friday, 11:15am – 12:15pm

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:

Undergraduate and Graduate

ASSIGNMENTS	% for the Final Grade	CHARACTERISTICS/ REQUIREMENTS
Proposal for the (Final Paper)	15% 15%	-At least 2 pages (double space) and 4 References -At least 3 pages (double space) and 6 References
Final Research Paper	30% 30%	-At least 8 pages (double space) and 6 References -At least 10 pages (double space) and 10 Ref.
Abstract (Final Paper)	Not Required 5%	250 words plus keywords
EXAMS	-Mid-Term: 15% and 15% -Final Exam: 15% and 15%	Multiple Choice Questions
GROUP PROJECT	15% 10%	-Group activity -Exposition of a case of pollution in the NYC area
PRESENTATIONS	5% 5%	~ 5 minutes (e. g. using PowerPoint) ~ 10 minutes (e. g. using PowerPoint)
PARTICIPATION	5% 5%	
Meetings outside the class		-Not required -Required at least ONCE

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 28th (Friday): Introduction, Science/Traditional Knowledge, and Pollution

1. Introduction to the Course and Description of the Syllabus
2. Science and the Traditional Knowledge
3. What is Pollution? And Transboundary Pollution?
4. Pollution and Environmental Justice

Required Materials:

-Bradford, Alina (2015). "Science & the Scientific Method: A Definition." *Livescience* (March 30). Available at http://www.livescience.com/20896-science-scientific-method.html

-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

-Nicholas, George (2018). "It's taken thousands of years, but Western science is finally catching up to Traditional Knowledge." *The Conversation* (February 14). Available on https://theconversation.com/its-taken-thousands-of-years-but-western-science-is-finally-catching-up-to-traditional-knowledge-90291

-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: Earth's Atmosphere:

February 1st (Tuesday):

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 1): Selecting a Research Topic (objectives)

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 4th (Friday): 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 2): Construction of the Research Questions/Focus

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: Atmosphere and Pollution 2:

February 8th (Tuesday): Class Follows Friday Schedule

1. Wildfires
2. Volcanic Eruptions
3. Aerosols
4. Proposal (Phase 3): Methodology (Data collection)
5. Group Work (phase 1): Making the Groups and Topic Selection

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

February 11th (Friday): NO CLASS

PART III: Hydrosphere and Pollution

Week 4:

February 15th (Tuesday): The Hydrosphere:

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): Literature Review and Intellectual Contribution

Required Materials:

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

February 18th (Friday): 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. Group Work (phase 2): Report

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

Week 5:

February 22nd (Tuesday): Oceans and Pollution 2:

-PROPOSAL of the Research Paper DUE

1. The New Arctic Exploitation and Pollution
2. Oil Spills
   -Case: Quinhagak (Alaska): Oil Spill, Alaska's Native community of Quinhagak, and Mushrooms. Invited Speaker: Howard Sprouse. You can find his podcast posted on The Greenbelt Society's website. Available at https://greenbeltsociety.wordpress.com/2020/10/17/recent-podcasts/

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/

February 25th (Friday): Oceans and Pollution 3:

1. Submarine Mining
2. Acidification
3. Coral Bleaching
4. Research Paper (phase 1): Construction of the Thesis (Argument)

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:

March 1st (Tuesday): 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
4. Research Paper (phase 2): Visualizing the Paper Skeleton

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 4th (Friday): 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 3): Report

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 8th (Tuesday): Nuclear Energy and Pollution

1. What is Nuclear Energy?
2. Fission and Fusion
3. Nuclear landscape: uranium mining/enriching, reactor, and deposit
4. Final Research Paper (phase 3): Figures/Tables/Maps

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 11th (Friday): Nuclear Pollution

1. Radioactivity
2. Nuclear Residual Materials
3. Ocean Dumping Events and Transportation
4. Nuclear Reactor/Facility Accidents
   -Case: Chernobyl (former USSR) (1986)

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

-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

Week 8:

March 15th (Tuesday): **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 18th (Friday): Coal and Pollution 2

1. Coal and Pollution
2. Coal and the Trans-border Pollution
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/

-Wong, Edward (2014). "China Exports Pollution to U.S., Study Finds." *The New York Times* (Jan. 20). Available at https://www.nytimes.com/2014/01/21/world/asia/china-also-exports-pollution-to-western-us-study-finds.html

Week 9:

March 22nd (Tuesday): MID-TERM Exam

March 25th (Friday):

1. Research Paper (phase 4): Checking the draft of the document
2. Group Work (phase 4): Report

Saturday March 26: 1st Ecological Tour: Newtown Creek (Greenpoint, Brooklyn)

See Appendix 1 under "Participation."

Week 10:

March 29th (Tuesday): Petroleum and Pollution:

1. Petroleum Basics: Formation, Types, and Petroleum Landscape
2. Pollution Issues of:
    a. The Canadian Oil-Tar Sand
    b. Hydraulic Fracturing (Fracking)
    c. Trans-Border Oil Transportation: Pipelines and Trains

Required Materials:

-Al-Jazeera (n.d.). "To the Last Drop: Canada's Dirty Oil Sands." Available online at https://www.aljazeera.com/programmes/witness/2011/06/20116227153978324.html

-Brown, Matthew (2018). "US miscalculated benefits of oil train brakes" AP (December 20). Available at https://www.apnews.com/2e91c7211b4947de8837ebeda53080b9

-Reisser, Wesley and Reisser, Colin (2019). Chapters 4, "Oil" in *Energy Resources: From Science to Society*

-Smith, Mitch and Bosman, Julie (2017). "Keystone Pipeline leaks 210,000 gallons of oil in South Dakota." *The New York Times* (Nov. 16). Available at https://www.nytimes.com/2017/11/16/us/keystone-pipeline-leaks-south-dakota.html

-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/

April 1st (Friday): 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 Patters in the Biosphere"

-Chapter 11, "Terrestrial Flora and Fauna" in Physical Geography by Tom L. McKnight

Week 11:

April 5th (Tuesday): 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-butcanadians-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-toWildlife/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 8th (Friday): Planes, Ships and Their Pollution

1. Airplane Traffic
2. Shipping Transportation
3. Research paper (phase 5): Checking the draft of the document
4. Group Work (phase 5): Report

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

April 9th (Saturday): 2nd Ecological Tour: from Central Park to Grand Central Terminal
(See the section "Participation" on Appendix 1)

Week 12:

April 12th (Tuesday): 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?

4. FINAL RESEARCH PAPER DUE

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 15th (Friday): NO CLASS; SPRING BREAK

Week 13: April 19th and 22nd: NO CLASS; SPRING BREAK

Week 14:

April 26th (Tuesday): 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#

April 29th (Friday):

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

Week 15

May 3rd (Tuesday): Climate Change: Facing the Unknown

1. What is that so-called Climate Change and Global Warming?
2. Past Climates
3. Causes of Climate Change

Required Materials:

-Chapter 11: "Climate Change."

May 6th (Friday): Some Consequences of Climate Change:

1. Sea Level Rise Impact in:
    a. Coastal landfills
    b. Nuclear residual sites
    c. Salinization
2. Ocean Heat waves ("Hot Blob"): Guest Speaker: Natalie Monterrosa
3. 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-destroynuclear-dump/

-Leman, Jennifer (2020). "Welp, Scientists Found 28 New Virus Groups in a Melting Glacier." *Popular Mechanics* (Jan. 23). Available at https://www.popularmechanics.com/science/health/a30643717/viruses-found-melting-glacier/

-NPR (2018, Jan. 24). "Are There Zombie Viruses In The Thawing Permafrost?" Available at https://www.npr.org/sections/goatsandsoda/2018/01/24/575974220/are-there-zombieviruses-in-the-thawing-permafrost

-*The Guardian* (2020, Jan. 16). "Huge 'hot blob' in Pacific Ocean killed nearly a million

seabirds." Available at https://www.theguardian.com/environment/2020/jan/16/hot-blobocean-seabirds-killed-new-zealand-north-america

Week 16
May 10th (Tuesday):
-PRESENTATION of the GROUP WORK: Environmental/Technological Pollution Case in New York City

May 13th (Friday)
-PRESENTATIONS 1 (Final Research Paper)

Week 17:
May 17th (Tuesday): LAST DAY
-PRESENTATIONS 2 (Final Research Paper)

May 20th (Friday): NO CLASS

Week 18
May 23rd (MONDAY): 9:00am-11:00am
-FINAL EXAM
-PRESENTATIONS 3 (Final Research Paper) and Final Ecological Meditations about the Current Ecological Crisis

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

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 Research Paper:

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

2. Final Research Paper:
The students should choose a topic that is related to Planet Earth. The main component to evaluate the paper will be the solidity and clarity of the argument (or thesis), and the examples and information that you provide to corroborate it; that is the evidence. Moreover, the paragraphs should be built around textual evidence in the form of quotes or paraphrases. Although any writing style (MLA, APA, Chicago, Harvard, etc.) for all of the in-text quotations can be used, the students must be coherent. For this paper, the undergraduate students should use 6 references (for Graduate students at least 10 references) (books, chapters, journal articles,

interviews, audios, etc.) to support their thesis in this paper. In addition, the paper must be double spaced, with heading and title.

Structure of a Research Paper

-Introduction

a. Brief description of the main topic of the paper
b. Research question/s and objectives
c. Argument (or thesis)

-The Main Core of the paper: This is the central section of the paper where you provide enough information, cases, examples from other scholars to defend your argument.

-Conclusion: This is the part of the work where you summary your paper.

-Bibliography (or References, Works Cited): Section where you show all of those scholars' works that you have used in your work.

An example of a research question and argument could be:

"In this paper I will analyze the question how did Eratosthenes know the Earth's size more than 2,000 years ago? I argue Eratosthenes possessed privileged information that he collected in the Alexandria library."

Other alternative structure could be,

1. Introduction
2. Literature Review
3. Methodology
4. Results
5. Discussion
6. Conclusion
7. Citations

For a completed description of this type of scientific paper structure, see *Nature* (2014). "Scientific Papers." Available at https://www.nature.com/scitable/topicpage/scientific-papers-13815490/#:~:text=To%20reach%20their%20goal%2C%20papers,aim%20to%20inform%2C%20not%20impress.&text=Papers%20that%20report%20experimental%20work,body)%3B%20and%20finally%2C%20Conclusion.

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

Note: The students will receive feedback for the proposal, final paper, and the poster. They will have possibilities to re-write some of the reviews for the proposal.

4. 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

5. Group Work: 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 (see above). An ideal situation would be to select a particular area (e. g. a neighborhood) and collect data (primary and seconday 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). 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.

6. 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 5 minutes
-Graduate students: around 10 minutes

7. Participation:
Two Types:
a. Class Participation:
Participation is fundamental for your success in this class and includes all of the following: class discussion, Blackboard posts, group activities, data-collection quizzes, environmental fieldtrips, 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. Outdoor Participation (Ecological Tours): OPTIONAL
-Description of the Activity: The main objective of these two outdoor activities is to observe directly on the field some of the main environmental/technological issues (e. g. natural gas power plant or climate change effects) that we will see in class. The students will become direct observers as well as participants of this type of processes in the city of New York. Although it is **NOT** a requirement to go to all of them, **I recommend you strongly to attend to at least one of them.** This is the information about these tours,

-1st Ecological Tour: The Newtown Creek (Greenpoint, Brooklyn)
-When: Saturday March 26
-Time: 10:00am
-Directions: Take the "G" Train to the station Greenpoint Av. Wait at the corner of Manhattan Av. and Greenpoint ave (see the map below).
-Description: The Newtown Creek is one of the most fascinating spots nationally speaking in terms of environmental/technological hazards and disasters and very rich in natural history. We

will visit the scenario of one of the largest oil spills in US history as well as the largest water treatment plant facility in the city and an ecological restoration of the East River.

b. 2nd Ecological Tour: From Central Park to Grand Central Terminal
-When: Saturday April 9th
-Time: 10:00am
-Directions: Take the trains N, Q, R, W to 57th Station and walk through 7th ave and wait at the entrance of Central Park (59th street and 7th ave).
-Description: We will visit,
a. Central Park (south section)
b. 57th street
c. Rockefeller Center
d. Diamond District
e. Union Carbide building
f. Grand Central Terminal

See map below


Central Park
Rockefeller Center
57th Street
Diamond District
Grand Central
Union Carbide
Lincoln Center
Fordham Univ.
Columbus Circle
The Pond
Central Park South
Carnegie Hall
Park Ave.
St. Patrick's Cathedral
Rockefeller Center
Sixth Ave.
Fifth Ave.
Eighth Ave.
Ninth Ave.
Tenth Ave.
Eleventh Ave.
12th Ave.
U.N. Headquarters
Queens Midtown Tunnel
Lincoln Tunnel
Javits Center
Madison Ave
Bellevue Hospital
NYU Med. Center
New Museum of Contemporary Art
Union Sq. Park
W. 61
W. 60th
57th St
48th
E. 59th
E. 48th
E. 46
E. 42nd
E. 34
31st
W. 30th St
W. 25th
E. 29nd
W. 20th St.
E. 20th St
W. 17th
E. 17th
W. 14th
E. 14th